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DIESEL RAILWAY TRACTION

The November issue of this RAILWAY GAZETTE *publication, illustrating and describing developments in Diesel Railway Traction, will be ready on November 1, price 2s.*

History of The British Railways During The War 1939-1945

By R. BELL, C.B.E.

with a foreword by Sir WILLIAM V. WOOD, *President, London Midland & Scottish Railway*

This book describes the great war accomplishment of the railways for the nation and for world freedom. Mr. Robert Bell, C.B.E., was Assistant General Manager of the London & North Eastern Railway Company. After his retirement in May, 1943, he was invited by the railway companies to write this history, and all who are interested in the work of the railways in these memorable years will be indebted to him for this volume.

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THE RAILWAY GAZETTE
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Argentine Railways Named after National Heroes

THE prosaic, if descriptive, names of the former British-owned Argentine Railways and the State Railways are to be changed to accord more closely with the nationalistic aspirations of their new owners. President Peron has signed a decree renaming the railways after outstanding figures in Argentine history. The old and new names are as follow:—

B.A. & Pacific Rly.	Ferrocarril Nacional General San Martin
Argentine State Rlys.	Ferrocarril Nacional General Belgrano
Central Argentine Rly. ...	Ferrocarril Nacional General Bartolome Mitre
Entre Rios & Argentine N.E. Rlys.	Ferrocarril Nacional General Urquiza
B.A. Great Southern Rly. ...	Ferrocarril Nacional General Roca
B.A. Western Rly.	Ferrocarril Nacional Domingo Faustino Sarmiento

The isolated systems of the State railways in Patagonia will be called "Ferrocarril Nacional Patagonico." At least when the British railways were nationalised those responsible for their administration did not impose so great a strain on the memories of traders and public using the lines, for in most part the names of the Regions are similar to those of the railways they replace or are geographically descriptive. The Argentine administration has also decided to unify gauges, although it is recognised that this will take much longer than renaming the lines.

* * * *

Investigation into P.R.Os

The Government has set up a Committee under the Chairmanship of Sir Henry French to inquire into Government information services and to see whether costs can be cut and services made more efficient. The *Evening Standard*, in a leading article of which we give some extracts on our Scrap Heap page, suggests the abolition of all Government Public Relations Officers, although it raises no objection to the P.R.O. in business firms, where he is engaged to promote goodwill, which is a legitimate function of business. One is moved to wonder on which side of the line dividing business and Government departments fall the P.R.Os employed by nationalised undertakings such as transport, coal, and so forth. Do they rank as in the service of business or in the service of the State? There can be no doubt that most of the nationalised industries could do with a little public goodwill, although whether it is best promoted by a P.R.O. or by the giving of a better public service at more reasonable cost, may be debatable—if only by P.R.Os.

* * * *

Increasing Industrial Output

The Anglo-American Productivity Council which, it is hoped, will produce some valuable advice on the raising of output per man-hour in British industry, met for the first time on October 25. Sir Frederick Bain, of the Federation of British Industries, joint Chairman of the British section, said at a press conference afterwards that among the subjects discussed were capital equipment, investment, the question of quantity *versus* quality, costs, specialisation, and standardisation. Mr. Philip D. Reed, Chairman of the United States section, said that the American members were not fully familiar with United Kingdom problems and had come with no preconceived notions. He believed that the Council was simply a development of the many Anglo-American joint councils which had worked so successfully during the war. The two countries were now trying to win the peace together and there were indications that the Americans could learn as much from the British as the British could learn from the Americans. It is noteworthy that none of the nationalised industries will come within the purview of the Council. One of the United States members of the Council is Mr. Thomas J. Harkins, Assistant Grand Chief, Brotherhood of Locomotive Engineers, who has taken part in many boards of inquiry into railway working rules.

* * * *

Export Targets for 1949

Mr. Harold Wilson, President of the Board of Trade, announcing the export targets for 1949, at a press conference on October 25, said that although the 1948 target of 150 per cent. of the 1938 volume was within sight of achievement, import restrictions and increasing competition abroad, as well as shortage of raw materials at home, were expected to bring some slowing down in the rapid rate of expansion during

recent months. Consequently, it had been decided to reduce the original export estimate for the end of 1949, given in the House of Commons last September, from 160 to 155 per cent. of the 1938 volume, a target which Mr. Wilson regarded as realistic and well within the capacity of British industry to achieve. Most export categories are expected to yield further increases during 1949, though in some cases, targets have been reduced to below the end-of-1948 figures. In the raw materials group, the 1949 coal export target has been raised from a monthly rate of £3·90 million for 1948, to £6 million, or 57 per cent. of 1938. Iron and steel manufactures are planned to reach a monthly rate of £8·50 million, or 116 per cent. of 1938, and represent the minimum essential to meet export requirements. The vehicles group, which includes locomotives, is to be stepped up to 263 per cent. of the 1938 volume, with a monthly rate of £21·8 million, and the machinery group from 206 to 228 per cent. at £24·48 million monthly rate.

* * * *

Overseas Railway Traffics

Traffics at below last year's level have been registered by a number of overseas railways in the fortnight ended October 16, and in the case of United of Havana, declines of £7,786 and £28,808, for the combined railways, warehouses, and wharves, have brought the aggregate down to £280,408 below 1947. United of Havana traffics were £40.528 and £36,223 for the two weeks under review, and the aggregate for 15 weeks and 3 days now is £664,518. Receipts by the Antofagasta (Chili) & Bolivia have shown consistent increases for some time, though a small setback was sustained in the week ended October 17, during which there was a one-day holiday on the Chilian & Bolivian sections. For the two weeks, Antofagasta traffics were £57,520 and £54,010, and represent an increase of £10,308 in the first week and a decline of £1,092 in the second; since January 1, receipts to date are £2,259,650, or £473,896 above 1947. Unfavourable Leopoldina traffics at £51,675 and £53,265, resulted in a total decline by £16,735 for the fortnight, and on the aggregate they are now down by £464,640, at £2,315,495.

* * * *

The Condition of Railways in China

The continuance of a constantly-erupting civil war and lack of great quantities of materials of all kinds have resulted in little progress having been made so far in the rehabilitation of the various railways throughout China. Some of them even today are almost entirely closed down, notably the 680-mile Chekiang-Kiangsi line running southwest from Hangchow through Nanchang to meet the Canton-Hankow Railway near Chuchow. On the Tientsin-Pukow and Peiping-Hankow lines there is through working only over the Suchow-Pukow and Chengchow-Hankow sections respectively. Other lines were less seriously disrupted during the long war with Japan, and, apart from one local break in each, the Kowloon-Canton-Hankow and Lunghai railways are in operation throughout their 770- and 860-mile lengths. In the best position, however, are the Nanking-Shanghai-Hangchow system, 315 miles, and the Peiping-Tientsin-Taku lines, 114 miles, both of which are now functioning reasonably well. It is difficult to see how much progress can be made in restoring the various lines—especially in the rebuilding of their larger bridges—even with foreign assistance until such time as peace can be maintained internally in that vast country.

* * * *

Preventing Thefts on Railways

Payments made by the railway and settlements of claims made for losses of merchandise in transit amounted to £1,658,000 during 1947. Much of the trouble has been due to organised theft, and in the belief that the price of security is eternal vigilance, British Railways have set up "Traffic Security Parties" which are making a co-ordinated effort in a country-wide campaign against the theft of goods in transit. Mr. A. E. Hammett, the Commercial Superintendent, Southern Region, in the current issue of the *British Railways Southern Region Magazine* explains that these parties generally consist of four selected individuals, who pool specialised knowledge of claims business, station working arrangements, preventive duties, and police interests. These parties are not cramped by custom or precedent, and explore any method which promises success; specialised collections, checking, listing, locking, sealing, segregated loading, protected deliveries, and the avoidance of "black spots," are the foundations of the work on which their superstructure is built. Mr. Hammett appeals for the co-operation of every member of the Southern Region staff in support of the security parties.

* * * *

A Wider Appreciation

During recent years there has been much talk of the need for understanding between men and management and of giving the worker a wider interest in his industry. Much can be done by the house journal to foster intelligent appreciation of this type, provided the proper approach is made—the presentation of works news with sundry items of general interest on such topics as hobbies and sport. It is also an excellent arrangement for employees to contribute articles, and the journal will most successfully fulfil its function when readers are showing a healthy interest in its composition. Such needs have been fully recognised by a new monthly, the *North British News*, which expresses the intention of giving every section of the North British organisation a more intimate understanding of the firm's general position, problems, and objectives. This new journal, like its recently initiated contemporary, *Vulcan Magazine*, shows commendable enterprise and is worthy of careful reading both among North British employees and in other parts of the British locomotive manufacturing industry.

* * * *

Re-Opening of East Coast Main Line

The main line from Berwick to Edinburgh, which was severely damaged by floods in the second week in August, was re-opened for freight traffic on Monday last, October 25. Passenger services are to be resumed on November 1. The reason for the interval between the resumption of freight and passenger traffic is that no margin of time exists for overcoming last-minute difficulties, and that during the first week, several severe speed restrictions will be in force over the temporary bridges, and sections of new track. The passage of 39 daily freight trains will help to consolidate the track before passenger services are resumed. From November 1, most of the speed restrictions will be eased to 15 to 30 m.p.h., and all passenger trains will resume running *via* Berwick and Dunbar, with savings in journey time of up to 45 min. In view of the prevailing abnormal conditions, the re-opening of the railway within 11 weeks of the disaster is a noteworthy achievement. The damage caused by the floods, and work of restoring the railway, are described in detail elsewhere in this issue.

* * * *

New Types of Bridge Spans

It will be remembered that, during the war, the Americans produced a novel and unorthodox type of bridge span, suitable for rapid erection, and consisting of trusses arranged in V formation, either as deck- or through-type superstructures.* This idea has recently been carried further by the Germans in certain examples of their new *Mittelträgerbrücke* or middle-support bridge. In two of these examples, an inverted-V or A-shape main truss is erected on the centre line of the bridge and carries dual roadways or railway tracks cantilevered out on both sides. In one example the decks are in line with the apex of the A and are bracketed out with struts from the A bases. In the other, through or continuous cross-girders, halfway down the A are used to carry the decks. A 330-ft. span of this latter design is to be used for the construction next year of a road bridge over the Ostertal River in the French Zone of Germany. A third example has an inverted-Y section of main truss, with roadways bracketed out at the intersection of the three arms of the Y. The general idea of the "middle-support bridge" is discussed in the note below.

* * * *

The Middle-Support Bridge

The more normal type of middle-support bridge consists of a single main member—either a truss, an arch rib, or a suspension cable—on the centre line of the bridge, with the road or rail decking cantilevered out, usually at its base. This design

* Described in our publication *Standard Military Railway Bridges*

can be used for very long spans. The advantage claimed for it is that there is a considerable saving in both sub-structure width and in steelwork. On the other hand, its design has to provide for high torsional resistance, especially when the A truss is not used. This is easily understandable in a railway bridge, one track of which will be loaded from end to end and the other normally unloaded at the same time; also in the case of heavy one-way road traffic. Wind pressure also creates new problems in this connection. The designers are confident, however, that ample factors of safety can be allowed against all such contingencies. They are at present confining their designs to steel spans, but believe these can readily be adapted to reinforced-concrete superstructures.

* * * *

Gas Turbine Supplies City Electricity

A successful practical application of a gas turbine to electrical generating plant has been made in Switzerland, where a three-phase generator driven by an Oerlikon turbine has shared in supplying power to the city of Zurich. The type of power unit used, described in the *Bulletin Oerlikon*, differs from that of the pioneer Brown Boveri experiment in gas turbine traction in that separate turbines are used for driving the compressor and generator, an arrangement similar to that adopted in the Metropolitan-Vickers design for a Great Western Railway locomotive. By this means the speed of the compressor can be varied independently of the main turbine so as to maintain the best air-fuel ratio for varying conditions of load, a requirement which is harder to meet when both turbines are on a common shaft. The use of the exhaust gases to pre-heat the air on its way from the compressor to the combustion chamber is now familiar in gas turbine technique, but the Oerlikon installation goes further towards realising the high overall efficiency claimed for this type of prime mover by diverting part of the exhaust to provide heated combustion air for a steam boiler in the generating station. Useful experience has been gained of some experimental features of the design, such as a centrifugal instead of an axial compressor, and in connection with turbine blades of special shape.

* * * *

Nationalisation of Steel

NOTWITHSTANDING the constant establishment of new output records for the British iron and steel industry, and the notable demonstration it has been giving of enterprise and efficiency, the Government is pressing forward with its plans to impose State control. In doing so there can be no question that it is acting in pursuance of an idealogical doctrine divorced from all concepts of industrial expediency or responsibility to the nation's commercial wellbeing.

As we close for press, the Bill to implement the Government's decision had not been published in detail, but it appears to be generally accepted that the organisation will differ substantially from those which have been imposed on the coal and transport industries. It is understood that what is envisaged is a single central co-ordinating authority and that the Bill will set up a corporation with powers to acquire the capital of undertakings concerned in all stages of steel production. About 150 of the largest undertakings are expected to come within this category and to be nationalised. The remainder, which operate on a smaller scale, will be free to continue under private ownership, though under licence from the corporation.

Two interesting features are noteworthy in the forecasts which have been made of the steel Bill. These are, first, the intention to operate State control by means of what will be, in effect, a great holding company exercising financial, rather than directly administrative, control of the major undertakings. The second is the suggestion that the larger undertakings will retain the names they have made famous in export markets all over the world. From the latter it appears that the Government has admitted the desirability of endeavouring to maintain the value of the goodwill in overseas markets which is possessed by these trade names.

We think it is a pity that similar steps were not taken when transport nationalisation was brought into being. Our readers may recall that about a year ago we suggested a similar arrangement in respect of the railways, and on several occasions we have urged the desirability of following the example of India, where under nationalisation the railways still continue to operate under their original identities and are administered by general managers and separate administrators, although they are controlled by the Central Railway Board Authority.

Whatever the divisions in the steel industry effected by the new Bill, they can hardly fail to have a disturbing effect on output at a time when the over-riding need is for greater production. The tendency towards bureaucratic methods of control which are becoming a commonplace in socialised industries, must make for a slowing down in both methods of working and in the expansion of production. The good management and close teamwork which have enabled the industry, despite raw material shortages and other difficulties, to raise the rate of output from 12¾ million tons last year to well over 15 million tons this year, may well be disrupted if the control exercised at the top is permitted to permeate down through the industry. The Government would have been far better advised to have confined itself to ensuring raw material and labour supplies to an industry which has amply proved its competence to make the best use of them.

* * * *

Lesser Freight Traffic Routing

IN our issue of October 15 we commented on the fact that the *Railway Review* was very critical of certain alterations which were being made in the handling and despatch of goods traffic at Leicester. We explained that the re-organisation in the allocation of traffic related to lesser freight traffic only. Mr. David Blee, Member of the Railway Executive, has contributed an article to the *Railway Review* which is published in the October 22 issue of that journal, replying to the criticisms. He points out that there are three goods stations in Leicester and that it was, perhaps, inevitable that duplicate loadings of smalls should have occurred in the past. What has been done under the new scheme has been to concentrate loadings on that station in Leicester from which the best service can be given to the public. These arrangements, which he emphasises were freely worked out by the local managements, took into account not only the terminal position at Leicester, but also the train services, conditions existing at intermediate junctions on the route, and the terminal and delivery services at destinations.

As we pointed out in our comment on the *Railway Review* article, there are bound to be changes in these arrangements as improvements are made in other parts of the country. Mr. Blee shows that some changes had been made before the *Railway Review* article was published, and he adds that occasional mistakes will be made. Dealing specifically with the example cited, Mr. Blee points out that the rail distance from Leicester, Belgrave Road, to Nottingham, London Road, is 41 miles 16 ch, and not 64 miles, as, indeed, the author of the *Railway Review* article since has acknowledged. The arrangements made suited the terminal position at Belgrave Road and the slightly longer route enables a lightly-loaded train, which it is necessary to run, to accommodate the Nottingham traffic; the Leicester-Sheffield train on which Nottingham's traffic was formerly conveyed was already well loaded. The diverted traffic arrives at Nottingham, London Road, at 1.15 a.m. on the next morning in ample time for delivery when traders' premises are open. Delivery of Nottingham town traffic can be arranged as effectively from Nottingham, London Road, as by Queen's Walk. He adds that many traders have expressed already their appreciation of the improved services given by the altered Leicester arrangements.

Mr. Blee challenges any suggestion that the railway administration is over-centralised so that it stultifies local enterprise. The Railway Executive accepts responsibility for principles and policies, but local management has every opportunity of contributing to these. He concludes his article by emphasising that the Transport Act leaves freedom of choice with the customer. He can choose the railway services; those given by the so-called short-distance hauliers or by the specialist hauliers; or he can have his own lorries and carry his own traffic. In the end, he maintains, the trader will choose the means of transport which provides the most efficient and economical service for him.

Adhesion and Friction in Rail Traction

THE vital influence of friction and adhesion on the design and performance of railway locomotives and rolling stock is freely acknowledged, yet there is still comparatively little conclusive scientific evidence on which the engineer can draw in his design problems. Yet without adequate knowledge of friction effects, the acceleration and retardation of trains cannot be predicted. A noteworthy attempt to improve this state of affairs was made recently by Mr. Jury Koffman, A.M.I.Loco.E., who in his paper "Adhesion and Friction in Rail Traction," which he presented to the Institution of Locomotive Engineers in London on October 20, 1948, gave a remarkably complete summary of researches in this subject from earliest times.

Being largely a résumé of investigations carried out in other countries, it is, however, a somewhat difficult paper to discuss. The author has ransacked the technical literature of the world for the various groups of test results which, with infinite patience, he has collated in numerous useful graphs. Indeed, one of the rather striking things about his large 68-item bibliography is that so few of the papers and reports which he has consulted are in English. The most notable exceptions are Sir Douglas Galton's classic reports to the Institution of Mechanical Engineers in 1878-79; Professor G. V. Lomonossoff's "Introduction to Railway Mechanics" (1933), and L. K. Sillcox's "Mastering Momentum" (1941). Galton's work was not directed towards the investigation of adhesion problems, however, but was confined to the friction between brake blocks and wheels.

The rather meagre information on friction and adhesion which was available in the latter part of the nineteenth century was, however, sufficient to enable designers to continue until a few years after the first world war. With the appearance of new fast schedules, however, and (in some countries) powerful electric locomotives able to develop very high tractive efforts (up to the limit for the adhesion available), it was a matter of necessity to have further information on friction and adhesion coefficients. Again, the fast steam and diesel-electric services which were introduced in the middle 1930s provided fresh problems in braking from 100 m.p.h. or more. Fortunately, as Mr. Koffman remarks, this trend towards higher speed was accompanied by a tendency to use lighter rolling stock.

The paper comprises two main sections, dealing respectively with the adhesion and the friction (braking) aspects. These twin subjects are covered with great thoroughness. Mr. Koffman, however, does not lose sight of what the designer really wants in the field of fundamental research, and successfully indicates practical results ready for application to current problems of design. But he leaves the actual application of the results, and also the design details, to others. Extraneous effects, too, such as flange forces and their effects, do not figure in the paper; likewise the detail design of brake gear is not included.

From an embarrassing wealth of figures, the plain fact emerges that for dry rails, a coefficient of adhesion of 0·25 may be assumed for speeds up to 40-50 m.p.h. At higher speeds, however, there is less information to draw on. Above the 40-50 m.p.h. range, the dependence of adhesion on speed introduces a bend into the curve connecting speed and power output. The author finds the values of the coefficient of adhesion μ and speed V to be related by the equation

$$\mu = \frac{30}{V + 75}$$

which, he states, is for speeds up to about 150 m.p.h. For wet rails, the coefficient of adhesion is reduced to about 0·6 of the value given by the foregoing equation. In general, the forecasts made formerly about the amount of adhesive weight needed for the development of power at high speeds are considered by the author to have been unnecessarily gloomy.

Mr. Koffman makes a frank confession of the difficulties of allowing for the many variables encountered in brake-block friction. Nevertheless, there is abundant evidence of the dependence of coefficient of friction on speed and brake-block pressure. "It is here," he states, "that the most undesirable qualities of cast-iron brake blocks come to light." He makes a strong plea for the development of alternative materials for brake blocks, since the need will become more urgent as speeds increase and the necessity for more efficient braking becomes pressing. Here the aim should be to find substances for which the coefficient of friction is less affected by speed than in the case of cast iron; the effect would be to allow acceptable braking distances without having to use high braking ratios, so that a reduction in the weight of brake gear could be contemplated.

One continuing mystery, referred to by Mr. E. S. Cox in the ensuing discussion, that the paper does not explain, is why some types of locomotive are more prone to slipping than others, despite practically identical adhesion factors and other relevant data. To some extent this may be due to the actual condition of the engine, as hinted by Mr. Julian Tritton; in a locomotive with badly-worn big-end brasses and coupling-rod bushes, for instance, an appreciable rotary movement can occur in the driving axle, when the regulator is opened, before it is taken up by the coupling rods and transmitted to the other coupled axles, so that the chances of slipping are thereby increased. This, however, is only part of the story, and still leaves unexplained certain instances of proneness to slipping, on the part of engines in good running trim, which come readily to mind.

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Opening of the Locomotive Testing Station at Rugby

WE have heard the project of the locomotive testing station at Rugby referred to as "Sir Nigel Gresley's dream." But Sir Nigel Gresley was no mere dreamer; he worked unremittingly for many years to bring about the establishment of his scheme, which he considered to be of vital importance in the future development of the locomotive. It is a matter of regret that he did not live to see the completion of the Rugby testing station, which was formally declared open on Tuesday, October 19, by the Minister of Transport, Mr. Alfred Barnes, M.P.

It is twenty-one years since Sir Nigel Gresley delivered his presidential address on "A National Locomotive Testing Plant" to the Institution of Locomotive Engineers. With this address he launched his campaign, although he may not have considered the word "national" in the sense in which it applies today. He envisaged a testing station supported by the four main-line railway companies; and for a time the prospects were hopeful, but the trade slump in the early 1930s caused the plan to be postponed. Nevertheless, he continued to press for the work to go forward; even in the dark days of 1931 he kept the matter alive and delivered his paper on "Locomotive Experimental Stations" to the Institution of Mechanical Engineers at its summer meeting in Cambridge; and at last, in 1936, it was finally decided that the L.M.S.R. and the L.N.E.R. should join forces to build a testing station primarily for their own use, although they were willing to make it available to other users.

A good deal of constructional work had been accomplished when war broke out in 1939, and the whole project was again shelved. Yet the testing station was held to be of such importance that in 1944, before the war was over, the scheme was revived again, and Mr. D. W. Sanford was appointed Superintending Engineer. For health reasons, Mr. Sanford was obliged to resign early in 1948, shortly before his death, and Mr. D. R. Carling, the present Superintending Engineer, was appointed.

It was a great pity that the pioneer testing plant in this country, which was built in 1905 by the G.W.R. at Swindon, was too small for most of the work which its owners would have liked to carry out on it. Although it yielded useful results, it could not absorb more than 500 h.p. No such mistake was made in the design of the Rugby testing station. Of the seven pairs of rollers which support the locomotive, any number up to five pairs can be driven by the coupled wheels. Each pair of rollers is coupled to a Froude dynamometer capable of absorbing 1,200 h.p., so that an absolute maximum of 6,000 h.p. can be absorbed if required, although the rated capacity of the plant is 4,500 h.p. A maximum speed up to 130 m.p.h. can be dealt with. Further provision for future developments is reflected in the designing of each roller unit to carry a maximum axle load of 30 tons.

The upper limit of the power which can be absorbed is governed by the permissible temperature rise in the water circulating through the dynamometers. To keep the consumption of water within reasonable bounds, a cooler is provided to enable

the water to be recirculated through the dynamometers; when dissipating energy equivalent to 4,500 h.p., with a maximum water flow of 30,000 gal. per hr., the temperatures of the water at inlet and outlet are 140° and 100° F. respectively.

A good example of the careful forethought which has been expended in designing the testing station is to be seen in the design of the control room, the nerve centre of the whole plant. Here, every dynamometer can be controlled separately; alternatively, a master control can be made to operate all of them simultaneously. Changes in the loadings of the axles can thus be made either singly or together as desired. The recording table, connected to the Amsler dynamometer, is in the centre of the room, and the control desk is just inside a large window commanding a clear view of the interior of the building. The comfort of working in the control room will be greatly increased by the soundproofing of its walls and the provision of double windows.

An extremely wide range of possible investigations has been visualised. Apart from the Amsler dynamometer for the recording of drawbar pull, there are instruments for making measurements of steam, feed water, and flue gas temperatures; recordings can be made of boiler, steam chest, and exhaust steam pressures; smokebox, ashpan, and firebox vacua; apparatus is provided for continuous analysis of smokebox gases.

An interesting device, originally due to the pioneering efforts of the staff at the French National Railways testing station at Vitry, is the method of checking the accuracy of spacing of the rollers on the test bed, after a locomotive has been placed in position. By its use, errors of centring of about $\frac{1}{130}$ in. can be detected. It can be used either with the locomotive wheels stationary or when turning at moderate speed.

It is interesting to compare the layout of the present plant with that proposed in Sir Nigel Gresley's 1931 paper to the Institution of Mechanical Engineers. There was, for instance, his proposal to place the locomotive in a wind tunnel about 30 ft. wide and 25 ft. high, so that an approximation to running conditions should be secured. A good deal of misunderstanding about the purpose of the wind tunnel was evident in the ensuing discussion on the paper, it being supposed that it was for reproducing the effect of wind resistance on a train; and Sir Nigel had to reiterate what he had plainly stated in the paper, that it was to reproduce the effect of running conditions on the draught through the fire. The other chief difference between the proposed and the recently completed station was that in the former, instead of having independent brakes directly coupled to the shafts of the rollers, there were to be two heavy splined shafts running lengthways along the testing pit, coupled to the rollers by large bevel gears. One end of each of these splined shafts was to drive a cross-shaft, with suitable gearing interposed to raise the speed of the latter. On these cross-shafts the hydraulic dynamometers were to be fitted, so as to obviate the need for re-setting them each time locomotives having differently-spaced axles were to be tested. In those days Sir Nigel Gresley considered that four pairs of rollers, each capable of transmitting 750 h.p. to the dynamometers, *i.e.*, a total of 3,000 h.p., would suffice. The energy-absorbing capacity which he envisaged has been doubled in the present plant.

In an excellent brochure on the Rugby Testing Station which has been produced by the Railway Executive, the story of the early events leading to its establishment makes interesting, if sad, reading. Looking back to those days of heartbreaking delays in the years 1927-36, it seems difficult to understand why in this country there was so much talking whilst the French were actually building. Chiefly, the slump in the years 1929-33 must take blame; but it was a thousand pities that a project so powerfully supported, with a recommendation from the Government-sponsored Department of Scientific & Industrial Research, and a committee with Sir Alfred Ewing as its Chairman, was postponed for so long. Incidentally, the plans submitted by that committee to the Department of Scientific & Industrial Research "were mainly the joint work of Mr. Gresley and Sir Henry Fowler"—to quote Sir Alfred Ewing himself in a speech made on July 14, 1931. Sir Henry Fowler's name should surely have been included in the chronicle of events given in the official brochure. However, when Sir William Stanier succeeded to the position of Chief Mechanical Engineer, L.M.S.R., the testing station scheme acquired an even more redoubtable protagonist.

All these personalities played their part; but now the work of the testing station must go forward. As a tribute to the memory of its great champion, however, the locomotive selected for the inaugural test run was the three-cylinder Pacific locomotive named after him—*Sir Nigel Gresley*, now British Railways locomotive No. 60007. Just outside the building, another celebrated design was represented by another Pacific with an unforgettable personal link with the new test plant—No. 46256, *Sir William A. Stanier, F.R.S.*; and happily its distinguished designer was present. The programme of future research to be carried out will be a matter of the highest interest and importance to locomotive men all over the world. It is perhaps a pity that the design of the plant and building does not allow, apparently, for the testing of anything but standard-gauge locomotives built to clear only the British loading gauge. Many locomotives have been built in this country for duties abroad, which would have yielded results of great value on the test bed. Perhaps some day this point may be reconsidered in view of its vital interest to a valuable section of our export trade.

* * * *

"Canal for Sale"

THE 33-mile long canal, constructed to connect Basingstoke with the Thames, carries so little traffic nowadays that it does not interest the Inland Waterways Executive and may be sold by auction at an early date. On September 18 *The Times* took these facts as the text for an article on canals in general. The leader told in sentimental vein how canal carryings had dwindled and some waterways had been abandoned, suggesting that they had never overcome the handicap of having started as local concerns, not forming part of a fully united scheme of communication. Some improvement might reasonably be expected from a more unified system of control and "the new Executive has a better chance than has been given for 100 years to turn public attention to the modest benefits, *hitherto incompletely unrealised*, of commercial navigation on estuaries, rivers and canals."

The reasoning in this deliverance seems to be as shaky as the phrasing which we have put in italics. Canals always will be local concerns, serving a limited number of traders who occupy adjacent premises. They are the slowest and least flexible type of transport. Railways, with the advantages of speed, adaptability, and services covering the whole country, were powerful competitors, but as late as 1905 canals carried 42,000,000 tons of traffic. Then came the impact of road haulage, with its ability to carry anything anywhere. By 1926 canal carryings had fallen to 13,000,000 tons and remained at much the same level during the six years before the war. During the first 24 weeks of this year 4,999,000 tons originated on the waterways taken over by the British Transport Commission. Nearly half that quantity was composed of coal, coke, patent fuel, and peat; the rest of the traffic consisted principally of agricultural produce, industrial products, building materials, liquids in bulk, and raw materials.

This record does not support the opinion of *The Times* that canals have "secondary, but not negligible economic possibilities." Of the 50 undertakings running, those connecting river estuaries with inland industrial centres fare reasonably well and may justify some expenditure on development works. Speculative spending of money on the rest of the canals is unthinkable at the present time when essential expenditure on railways and roads is being restricted ruthlessly.

We can take warning from the experience of the United States, whose natural waterways seem designed by nature to afford cheap transport. Though $1,200 million have been spent on improving the Mississippi for navigation, river carriage is cheap for the firms which use it only because the taxpayer contributes heavily to the cost of movement. Again, the New York State barge canal, which is 525 miles long and connects the Great Lakes with the Hudson River, cost $220 million to build and another $12 million a year is needed to keep it open. There is no gainsaying the verdict that it would have been cheaper for New York State if all the freight conveyed by canal had been put into railway wagons and the State had paid the carriage accounts. If America, with its long hauls of heavy commodities passing in bulk, cannot make internal navigations pay their own way, it seems hopeless to look for any widespread revival of canals in this country.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Rugby Locomotive Testing Station

32, Russell Road,
London, W.14. October 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Like many others who had the good fortune to be present today at the opening ceremony of the locomotive testing station at Rugby, I could not but feel what a difference it would have made to the occasion if Sir Nigel Gresley had lived to be present, to see the realisation of his dearly-cherished project.

His photograph is the first object which one sees on entering the administrative offices there.

This testing station is indeed the memorial by which Sir Nigel would wish us to remember him. Would it not be possible for it to be known as the Gresley Testing Station, as a tribute to the great locomotive engineer?

Yours faithfully,
W. O. SKEAT

Continuous Brakes on Freight Trains

The Old Manor,
Salisbury, Wilts. September 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I was interested in Mr. G. H. Hafter's letter on continuous brakes for freight trains in the September 24 issue, but is he not assuming a lot that was never suggested or implied?

True, I did not mention angle cocks: their existence and uses are too well known to need alluding to. Nobody said anything about completely discharging the main train pipe on local trains; it is the cylinders of the incoming vehicles that might cause delay.

If the vehicles had just come off a train one would not expect very much trouble, but, doubtless, Mr. Hafter is aware that both the vacuum and Westinghouse brakes have a tendency to leak away if left standing for long periods.

A point in question was picking up at wayside stations. Here wagons can have stood for days, weeks, or even months (not much chance of it these days), when the cylinders might be absolutely "flat." A number of these brought on to the pipe might affect seriously the reservoir. The effect, of course, could be cumulative in the loss of time, which seems difficult enough to maintain even now. However, the problem need not be insoluble.

Yours faithfully,
COURTENAY BARRY

All-Stations Seasons

23, Somertrees Avenue,
London, S.E.12. September 15

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The editorial article on "All-Stations Seasons" in your issue of September 3 reminds me that the London Brighton & South Coast Railway used to issue such a ticket, which was, I believe, the only example of its kind in Great Britain. The North Eastern Railway offered, at the beginning of the century, an "All-Stations Holiday Ticket," first class only, for a week or a fortnight, but the Great Western Railway led the way in the local "Holiday Seasons," which were so common in 1939, by allowing unlimited travel west of Truro to holders of tourist tickets to Cornwall at the amazingly low price of 2s. 6d. This was in 1904, when the Cornish Riviera "Limited" commenced to run, and the price was raised in the following year.

I would suggest that "All-Stations Seasons," if issued by British Railways, should be for 3, 6, or 12 months, and that a cost be quoted for specified areas as well as for the whole country. The Southern and Western Regions, the Eastern, North Eastern, and London Midland Regions, and the Scottish Region would make three very suitable zones, and these local tickets might, I think, appeal to firms whose business did not extend all over the country. The cost of the Scottish Region ticket should not, of course, be based on mileage, in view of the large areas sparsely populated and with little or no appeal to commercial men, and, as you rightly remark, little cost would be involved in launching the scheme.

It has always seemed surprising that "all stations" tickets have not been much more widely adopted in Great Britain. On the Continent they have long been common in almost every country, in some form or another, and to attract visitors to the Colonial Exhibition in Paris an "all stations" ticket was issued covering all French railways. An "all stations and steamers" ticket for Scotland, fortnightly or monthly, would have been valuable as an attraction to visitors to the Glasgow Exhibition in 1938, and might now be very useful in connection with the "Tourist drive" for Scotland and the Edinburgh Festival, if it were taken up energetically by the Scottish Tourist Board.

Yours faithfully,
R. E. CHARLEWOOD

[Two examples of All-Stations Season Tickets are reproduced on page 488.—ED., *R.G.*]

East-West Connections

18, Milverton Terrace,
Leamington Spa. October 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Considerable as are the improvements in the winter timetables, the "iron curtain" between the east and west has not yet been dented, let alone penetrated. There almost seems to be a conspiracy between the Regions to prevent us Midlanders from obtaining easy access to the east and *vice versa*. South Wales and Birmingham still have the 5.5 p.m. curfew!

Surely it comes into the category of "Believe It Or Not" that there is no train from Rugby to Peterborough between 6.31 a.m. and 1.36 p.m.? A typical timing from Birmingham, New Street, to Peterborough, is that of the 7.30 a.m. which, after stopping at every station beyond Leicester, makes its arrival (probably in a breathless state) at 11.0 a.m. How valuable a Peterborough-Gloucester through train *via* Rugby and Leamington Spa would be.

I often wonder how much traffic is lost by the neglect of small towns which, however, are often important centres. For instance, there is not a train from London to Buckingham after 3.5 p.m. Unless a passenger to London from Daventry gets up in time to leave Euston at 6.45 a.m., he will not reach his destination—by train—till five o'clock in the afternoon. Such instances could be multiplied many times.

We probably cannot expect more trains on these secondary routes, but I suggest that there should be more sensible ones.

Yours faithfully,
GILBERT DALTON

Shorter Trains and More of Them

19, Holmhead Crescent,
Cathcart, Glasgow, S.4. October 3

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have been greatly interested in the series of articles appearing in *The Railway Gazette* for July 16, August 27, and October 1, under the above heading, and welcome the approach that you have made to promote a complete timetable revision as and when circumstances permit, but may I put forward the following suggestions with regard to your proposed Anglo-Scottish West Coast services, which were outlined in the October 1 issue.

Six daytime trains are proposed between Euston and Glasgow, all, it would appear, completing the 400 miles in the "standard" time of 8 hr. 15 min. This "standard" compares very unfavourably with the pre-war 7 hr. of "The Royal Scot," and 6½ hr. of the "Coronation Scot."

Commendable though it is in theory to spread the travel load evenly over the whole day, thereby avoiding a bunch of departures around 10 a.m., the fundamental factor remains that trains are run to suit the needs and desires of the travelling public. It must be conceded that 10 a.m. is the convenient hour of departure for the majority of day travellers from London to Scotland, as it is late enough in the morning to allow passengers to join the train from places as distant from London as 80 miles. Although realising the simplicity and benefits to be derived from your proposals, I feel that the scheme tends to be too rigid, barring altogether the introduction of any high-speed service.

The present-day service from Euston to Glasgow, with departures at 10 a.m. and 1 p.m., could be improved appreciably with the introduction of a late afternoon high-speed service in each direction leaving at 4 p.m. May I dare to suggest that both the 10 a.m. and 4 p.m. be hauled by twin diesel-electric units (1,600 h.p. each), thereby providing two non-stop runs daily in each direction in a satisfactory time of six hours. The late afternoon service from Euston would then reach Glasgow at 10 p.m., enabling connections to be made to various towns around Glasgow, whereas in the article of your October 1 issue, the 3 p.m. from Euston would not reach Glasgow until 11.15 p.m., when local transport has almost terminated. Also in the reverse direction one must assume that the 3.30 p.m. from Glasgow would not arrive in Euston until 11.45 p.m.

It is true, nevertheless, that the introduction of these two

high-speed trains would involve certain complications which could be overcome with a few minor adjustments, without altering the framework of your proposals. For example, the 9.10 a.m. to Birmingham could leave at 9.30 a.m., pass Rugby in the allotted 88 min. at 10.58 a.m., and the 10 a.m. down would pass Rugby at 11.10 a.m. It would be necessary for the 9.20 a.m. to Manchester to run non-stop to Stoke, arriving there at 12.5 p.m., thus passing Norton Bridge at roughly 11.49 a.m., the 10 a.m. down passing Norton Bridge at 11.58. The 9 a.m. ex-Euston should be altered to leave at 9.10 a.m. and run to Dundee instead of Glasgow, stopping at Rugby and arriving at Crewe at 12.06 p.m., there to await the passing of the 10 a.m. down at 12.15 p.m., and resuming its journey at 12.20 p.m., adhering to the "standard" running times north of Crewe. The 9.50 a.m. to Liverpool would have necessarily to leave after 10 a.m., and 10.10 or 10.20 a.m. may be suitable departure times. Finally, the 8 a.m. down to Glasgow, after leaving Carlisle at 2.05 p.m., should run *via* Kilmarnock, thereby giving a quick direct service from London (and also Lancashire), to south-west Scotland, also making a connection at Dumfries with a service to Stranraer, which during the summer season would form a boat train for Belfast.

By running the 10 a.m. down as a high-speed service, the 1.03 p.m. north from Crewe could start from Birmingham at 11.30 a.m., providing a most necessary service between Birmingham and Glasgow, as your proposal for the only through train to depart at 7.40 a.m. would necessitate the majority of intending passengers from Birmingham to Scotland having to change trains at Crewe, and sooner or later public opinion would bring about the return of a through train at a reasonable hour.

With these adjustments in the London-Glasgow service it would be desirable for the 12 noon down to run to Perth instead of Glasgow, and the 3 p.m. down could be dispensed with. The 4 p.m. to Carlisle would leave at 4.10 p.m., and the only other adjustment necessary for the introduction of the 4 p.m. high-speed down would be the necessity of the 3.20 p.m. to Manchester to run non-stop to Stoke.

In your article it would appear that there is no train from Preston to the north at 3.15 p.m., a gap which could be desirably filled by a combined afternoon train from Manchester (2.15 p.m.) and Liverpool (2.30 p.m.) with a balanced return working from Glasgow around 2.30 p.m.

Only northbound traffic "amendments" are mentioned in the preceding paragraphs, but similar adjustments to southbound proposals would have the desired effect of not only providing more and faster trains, but giving the travelling public the service it desires.

Yours faithfully,

WILLIAM G. GLEN-BAIRD

[We are glad to publish Mr. Glen-Baird's letter with its interesting comments, several of which will be found to be met in a coming article on "Shorter Trains and More of Them" in the Scottish Region. We agree, of course, that two high-speed trains, running non-stop from Euston to Glasgow in 6 hr., would give an admirable service for London passengers, but we question whether our correspondent quite appreciates the widespread dislocation, far beyond the few retimings he mentions, which their running would cause. Euston and Manchester expresses *via* Stoke leave the main-line at Colwich, passed in approximately 2 hr. 22 min. from Euston, and not at Norton Bridge.

It seems to us hardly fair to claim 10 a.m. as the "convenient hour of departure for the majority of day travellers from London to Scotland" when no other morning departure has been offered for very many years by this route. Similarly, the one through day service from Birmingham to Scotland is, and always has been, around 11 a.m., and, as the only other departures are today 6.35 a.m. and 2.25 p.m., the choice of services given by our scheme might not prove so unacceptable; habits change, but timetables do not always change with them. We realise the objection raised to our suggested service on the grounds of "rigidity," but simplified working and reasonable uniformity of speed, which are the basis of our proposals, must preclude, we fear, the running of high-speed trains, though some acceleration, of all services, is perfectly practicable. The timetable we propose has been put forward mainly as a basis for criticism—not with any idea that it should be slavishly followed as regards timings or stops—and we are sure it can be improved in many directions without sacrifice of its underlying principle.—ED., *R.G.*]

Locomotive Fuel Economy

5, Elm Terrace, Hoylake,
Ches. October 16

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In reply to Mr. R. Opie's comments on page 430 of your October 15 issue, I have to say that, uninfluenced by imagination or optimism, and completely indifferent to anyone's credulity, I wrote my previous letter in your October 1 issue because errors committed in public should be promptly corrected so as to minimise the spread of their evil.

In Chapelon's book on the work of his 4-8-0s there are indicator diagrams referring to 13 tests; in eleven of these the overall expansion ratio was less than 2·9 to 1, that is, less than occurs in a modern British Simple engine working at about 25 per cent. cut-off. The best compound performances therefore are not due to the use of any unusually high expansion ratio nor, consequently, to the use of a high boiler pressure.

I suggest, Sir, that correspondents at least should consult the published information on a subject before quibbling over the statements of anyone who clearly has already done so.

Yours faithfully,

J. F. SPURRIER

Publications Received

Fundamentals of Vibration Study. By R. G. Manley. Second edition. London: Chapman & Hall Limited, 37, Essex Street, W.C.2. 8¼ in. × 6 in. 156 pp. Price 15s.—The author of this valuable introductory guide to vibration theory states that the book embodies the subject-matter of a course of lectures which he delivered to the Vibration Department of the de Havilland Aircraft Company. Those who have heard him take part in technical discussions on the subject will recognise the businesslike style and complete absence of "padding" which characterise the present work. In this second edition, the various chapters have been extended by the addition of introductory and summary sections at the beginning and end of each; and two further Appendices (IV and V) have been added giving respectively a short theory to the solution of practical vibration problems and tables of some of the more commonly used quantities figuring in vibration calculations. The author has succeeded in minimising the amount of mathematical work in each section without oversimplifying it, by gathering the fundamentals of both the pure and the applied mathematical aspects of the problems into the Appendices. The book should be of especial value to those who wish to gain sufficient grounding in this highly specialised subject to enable them to study the more advanced technical papers which appear in the transactions of learned societies. The 53 illustrations are very clear, and the publishers have produced the book extremely well.

Flooring Hardwoods: Their Wear and Anatomical Structure. By F. H. Armstrong, M.Sc., A.M.I.Mech.E. Bulletin No. 21, Forest Products Research, Department of Scientific & Industrial Research. H.M. Stationery Office. Paper cover. 12 pp. 9½ in. × 6 in. Price 1s., by post 1s. 2d.—This fully-illustrated report deals with the behaviour of various hardwoods used for flooring under heavy industrial and other traffic, and shows how their suitability may be judged. It is of special topical value now that Empire and other foreign hardwoods are being used in place of the better-known species. Wear and breakdown are affected not only by the density, but also by the arrangement, size, and distribution of the pores of the timber. This point is illustrated by numerous photomicrographs, showing splintering and rupture of the larger pores and tissues in diffuse-porous hardwoods, as opposed to harder-wearing small-pore, fine-texture species. Waxpolishing to support and cement the larger pores is shown to be quite effective, but impregnation is more so. Size and distribution of pores can be gauged by inspection with a hand magnifying lens.

North British News. No. 1. September, 1948. Glasgow: North British Locomotive Co. Ltd., Springburn. 16 in. × 12½ in. 4 pp. Illustrated. Price 1d.—The first issue of this monthly house journal, editorial reference to which is made elsewhere in this issue, contains a variety of articles to cater for all tastes, which range from details of the firm's locomotive order book to soccer and ladies' fashions. Suitable attention is given to a number of aspects of North British business and social activities and the journal, which is in newspaper form, is willing to give careful consideration to employees' literary efforts.

Introducing Cranes and Machine Tools. We have received from Morrison, Marshall & Hill, 44-45, Tower Hill, E.C.2, a copy of a recently issued multi-language brochure describing the products of the firm's principals, which include electric cranes, lathes, power transmission appliances and precision metal sawing machines. The brochure, which is fully illustrated, is prepared in English, Spanish, Portuguese, French, and Dutch, and as such will be of added value to overseas buyers of factory equipment.

The Scrap Heap

Five-Day Seasons

Now that the five-day working week is becoming the rule, many would welcome a five-day railway season ticket.—*R. C. Merriman, in a letter to the "Sunday Express."*

* * *

Probe into P.R.Os.

Has the Cabinet seen the light about the Whitehall Public Relations Officers? Sir Henry French is to conduct an official inquiry into the Government information services to see whether costs can be cut, and the services made more efficient. This newspaper can tell Sir Henry how to solve his problem: Abolish the lot and sack the P.R.Os. That will save the nation more than £878,000 a year, and the public will get more news.

In 1938 there were 207 P.R.Os., who collected £100,000 a year in salaries. Now there are five times as many, and they cost eight times as much. Every Press department which had obtained a foothold in Whitehall before the war has expanded its frontiers into a pocket empire. There is an increased salary for the "Director," a staff of Press Officers to answer the telephone, and the usual number of minions to type the hand-outs.

The example set by Whitehall has been followed as a matter of course by all the innumerable boards and authorities and commissions and councils and various other public bodies which have multiplied since the war.

Government P.R.Os. are valuable because they are good propagandists for their employers. They put a favourable gloss on their activities; they protect them from criticism; they whitewash mistakes; and they stand between the Press and the original sources of news.

Now there is no objection to the P.R.O. in business firms. They engage P.R.Os. to promote goodwill, and that is a legitimate function of business.—*From the "Evening Standard."*

* * *

Horse in Tunnel

The York-Bristol express was held up while the Wickwar (Glos.) stationmaster searched Rangeworthy Tunnel in vain for a runaway horse.

"It must have come out at the other end," said a man who helped in the search.

At Bristol, where the train was 37 minutes late, a passenger said: "We could see torches flashing in the tunnel and hear shouts of 'Giddup.' We couldn't imagine what was going on."

British Railways said the express was held up for seven minutes.—*From the "News-Chronicle."*

100 YEARS AGO

From The Railway Times, *Oct.* 28, 1848

MR. HUDSON'S LEASES.

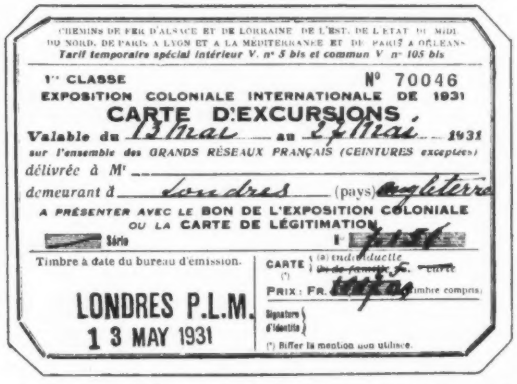
To the Editor of the Railway Times.

Sir,—Are the shareholders of the York, Newcastle, and Berwick Railway quietly looking on whilst Mr. Hudson is proposing to lease railway after railway on their accounts? If public opinion is correct, and I believe it is so in this instance, Mr. Hudson has not been fortunate in his leases. They have proved, indeed, very profitable to the lessors, and very much the reverse to the lessees; and such will be the case if the lease of the Newcastle and Carlisle Railway is sanctioned by the York and Newcastle proprietors. No wonder our shares are at a discount. The mere rumour of such improvident leases is sufficient to destroy confidence in a line which it is proposed to burthen in this manner, for no reasonable or probable expectation of gain to ourselves. Let me beg the shareholders to protect their own interests, and to put a stop to these impolitic investments. The Maryport and Carlisle lease I do not so much object to—the guarantee is small, and the line may pay; but if the Newcastle and Carlisle line must be leased to please Mr. Hudson (gain to the York and Newcastle shareholders is, I consider, out of the question), then let it be on other terms,—take their line at 4 per cent., and give them all the profits realised on their own line up to 6 per cent. or 7 per cent., or, if you please, 10 per cent.; in short, give them all they make, only protect us from loss.—Yours, &c.

A York, Newcastle, and Berwick Shareholder.

London, Oct. 19, 1848.

Examples of "All-Stations" Season Tickets and "Holiday Seasons"


CHEMINS DE FER D'ALSACE ET DE LORRAINE · DE L'EST · DE L'ETAT · DU MIDI · DU NORD · DE PARIS A LYON ET A LA MEDITERRANEE ET DU PARIS A ORLEANS

Tarif temporaire spécial intérieur V. n° 5 bis et commun V n° 105 bis

1re CLASSE Nº 70046

EXPOSITION COLONIALE INTERNATIONALE DE 1931

CARTE D'EXCURSIONS

Valable du 13 mai au 2 juin 1931

sur l'ensemble des GRANDS RÉSEAUX FRANÇAIS (CEINTURES exceptées)

délivrée à M^r _____

demeurant à Londres (pays) Angleterre

A PRÉSENTER AVEC LE BON DE L'EXPOSITION COLONIALE OU LA CARTE DE LÉGITIMATION

Série I 1re

Timbre à date du bureau d'émission.

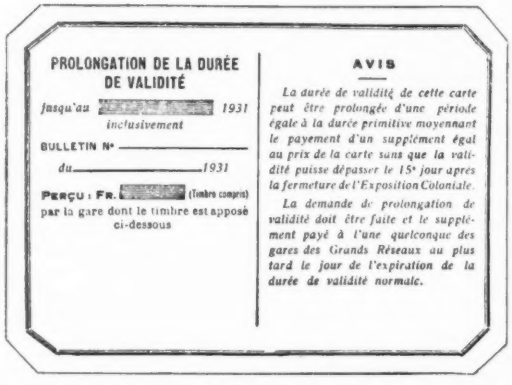
LONDRES P.L.M.
13 MAY 1931

CARTE (*ci-inclus/déduite*) (*) de fournir 1 carte

PRIX : Fr. 1[illegible] (Timbre compris)

Signature d'identité

(*) Biffer la mention non utilisée.


PROLONGATION DE LA DURÉE DE VALIDITÉ

Jusqu'au [illegible] 1931 *inclusivement*

BULLETIN Nº _____

du _____ 1931

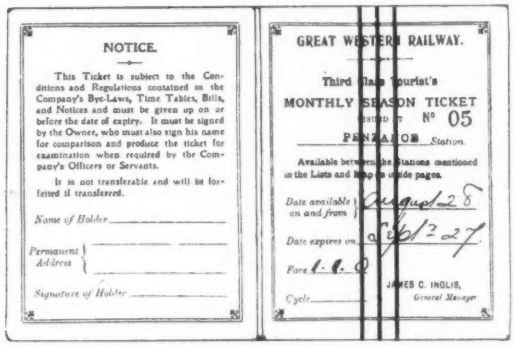
PERÇU : Fr. [illegible] (Timbre compris) par la gare dont le timbre est apposé ci-dessous

AVIS

La durée de validité de cette carte peut être prolongée d'une période égale à la durée primitive moyennant le payement d'un supplément égal au prix de la carte sans que la validité puisse dépasser le 15e jour après la fermeture de l'Exposition Coloniale.

La demande de prolongation de validité doit être faite et le supplément payé à l'une quelconque des gares des Grands Réseaux au plus tard le jour de l'expiration de la durée de validité normale.

One of the "All-Stations" tickets over the French Railways offered to overseas visitors in connection with the Colonial Exhibition in Paris of 1931. These tickets were obtainable in Great Britain and carried the holder from the port of entry to Paris, when they had to be stamped at the Exhibition before further use. They gave 15 days' travel, all over France, at £13 8s. first and £10 2s. second class, plus 4s. for a "carte de Legitimation;" an amusing feature of the issue was that the French Railways first offered them at the amazing price of £3 1s. 8d. and £2 6s. 8d., but very soon corrected the error! (See letter on page 486)


NOTICE.

This Ticket is subject to the Conditions and Regulations contained in the Company's Bye-Laws, Time Tables, Bills, and Notices and must be given up on or before the date of expiry. It must be signed by the Owner, who must also sign his name for comparison and produce the ticket for examination when required by the Company's Officers or Servants.

It is not transferable and will be forfeited if transferred.

Name of Holder _____

Permanent Address _____

Signature of Holder _____

GREAT WESTERN RAILWAY.

Third Class Tourist's

MONTHLY SEASON TICKET

Nº 05

PENZANCE *Station.*

Available between the Stations mentioned in the Lists and Map on inside pages.

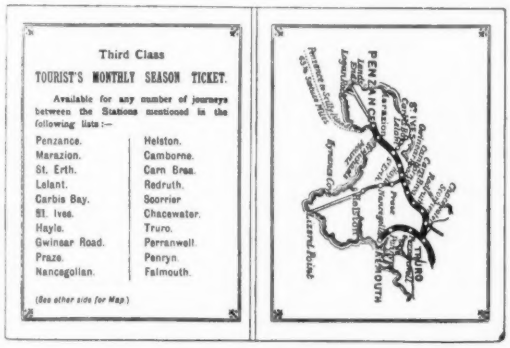
Date available on and from Augt 28

Date expires on 27/9/27

Fare £1 0 0

JAMES C. INGLIS, *General Manager*

Cycle _____


Third Class

TOURIST'S MONTHLY SEASON TICKET.

Available for any number of journeys between the Stations mentioned in the following lists:—

Penzance.	Helston.
Marazion.	Camborne.
St. Erth.	Carn Brea.
Lelant.	Redruth.
Carbis Bay.	Scorrier
St. Ives.	Chacewater.
Hayle.	Truro.
Gwinear Road.	Perranwell.
Praze.	Penryn.
Nancegollan.	Falmouth.

(See other side for Map.)

One of the earliest "Holiday Seasons" issued in Great Britain—A Great Western 1905 "All Stations West of Truro" ticket, at one guinea (third-class) for a month, issued to holders of tourist tickets to Cornwall. In the previous year a similar ticket had been on issue at 2s. 6d., when the "Limited" commenced to run and great efforts were being made to popularise the "Cornish Riviera"

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Cape Suburban Service

Some first class coaches are now available daily for the use of Europeans only on the Cape Town-Simonstown, Belville, and the Cape Flats lines. They were introduced as the result of a decision by the Minister of Transport, who said that he wished to appeal to all users of the Cape suburban services to co-operate to make a success of the scheme, which was devised in the interests of all sections of the travelling public. The Government was determined to apply the principle of reserving some accommodation for the use of European passengers only. Accommodation for non-Europeans would not be reduced either in quantity or quality, and the only new feature was that certain first class coaches would be set aside for European passengers. No reduction of accommodation for any section was implied.

The change affects only first class passengers. A census taken by the railways over a period of months showed that very few Europeans travelled second class on the Cape Peninsula system. In fact, the railways use only 45 out of 340 coaches a day for second class suburban travel, and it is not practicable to duplicate second class travel. The extent to which the railways are able to develop the scheme is limited at present by the shortage of coaching stock and the large number of passengers to be conveyed. When new equipment becomes available the matter will be reviewed.

PERSIA

Railways in New 7-Year Plan

The great industrial development planned for Persia is linked with an extensive programme of road and railway construction and repair. In the North, the Mianeh-Tabriz and Shahrud-Meshed railway lines are to be completed. Further to the south-east, the line from Qum to Kashan is to be extended to Yezd. Andimeshk, which is a quarter of the way from Ahwaz on the edge of the Khuzistan oil fields, is to be linked with the Iraq frontier by rail. To supplement the railways, it is suggested that a motor transport system should run beyond the termini, for example from Tabriz, in the north-west to the Turkish frontier, and from Kashan, 100 miles south, to Isfanan. Total expenditure on transport and communication including air services and ports is estimated at £39,000,000.

INDIA

Statement on Accidents

According to a statement made by the Minister for Railways, there were twenty-one train accidents during the twelve months from June, 1947, to May, 1948, including six accidents on the Eastern Punjab Railway during the period of disturbances. Total casualties were 285 dead and 846 injured. During the same period in the preceding year, the number of accidents was sixteen.

Reclassification of Passenger Accommodation

The Central Advisory Council for Railways has approved of the Railway Board's proposals to reduce the number of classes of passenger accommodation on trains from four to three. The new classes, from January 1, 1949, will be upper, intermediate, and ordinary. All first class compartments and half the second class compartments will be converted into upper class, the remainder of the second class compartments into intermediate class, and the existing third class will be re-named ordinary class.

The same classification will apply to new 11 ft. 8 in. wide coaching stock of the "Silver Arrow" type, when ready. The standard of amenities also will approximate to that exhibited in the second, intermediate, and third class on the "Silver Arrow" train. For the present, however, austerity standard will be observed. The fares for the upper class will be 24 pies a mile—midway between first and second class fares. The fares for the intermediate and third classes will remain unaltered. Sleeping accommodation will be available for upper class passengers only, but at the suggestion of some members, the Railway Board has undertaken to examine the question of providing, by means of special sleeping cars, such accommodation for intermediate class, also for an extra charge.

Manufacture of Wagons

The manufacture of railway wagons reached a peak figure during June, when the total out-turn was 503, of which some have been allotted to Burma. These additional wagons will help greatly in accelerating the movement of essential commodities such as sugar and foodgrains.

CANADA

Movement of Grain

Although a shortage of box cars for the handling of the new crop exists in the Prairie Provinces, the railways have been loading between 500 and 600 cars daily in Manitoba for more than a month. Approximately half the cars available to the Western Provinces for the transport of the grain crop, nearly 700 cars, are being loaded in Saskatchewan. Almost 1,000,000 bushels of all grains daily have been moving out of Manitoba by rail.

ITALY

Expanding Traffic

A marked increase in the passenger traffic on the Italian State Railways during the first half of the current year was recorded. Passenger train performance as expressed in mileage covered was 20 per cent. above the total for the comparable months of 1947, and amounted to 62·3 per cent. of the total attained in the 1938-1939 working year. The goods train performance, in terms of mileage covered, increased in the first six months of the current year only by 11 per cent. on total for the first half of 1947, although it reached 84·8 per cent. of the 1938-1939 total. In the 1938-1939 working year, passenger train mileage on the State Railways totalled 130,110,000 km., and goods train mileage 61,717,000 km.

Railway Electrification

Delivering the inaugural speech at the 49th annual congress of the Italian Electrotechnical Association, the Minister of Transport emphasised the magnitude of the electrification programme of the State Railways. He pointed out that the 4-year scheme now in hand comprises the building of 51 hydro-electric power stations at a cost of lire 300,000 million (approximately £200,000,000), in addition to four thermo-electric power stations costing lire 30,000 million (about £20,000,000), and one power station operating on natural gas, costing lire 15,000 million (about £10,000,000). When these power stations are in operation their annual output will be 5,000 million kWh.

Reminding his audience that Genoa, the town where the congress was taking place, had been connected with the first developments of electric railway traction in Italy, the Minister announced that the change over from the a.c. three-phase system of the railways converging on Genoa to direct current was to be taken in hand later as part of a scheme for unification of the various traction systems introduced since the first line of the State Railways was electrified in 1902.

SWITZERLAND

Federal Railways Budget for 1949

The budget of the Federal Railways for 1949, recently approved by the board of administration, envisages working receipts totalling fr. 671,700,000, and working expenditure amounting to fr. 500,500,000. The resulting working surplus of fr. 171,200,000 is fr. 41,900,000 less than that for 1947. The increase in the working expenditure derives, in the main, from a larger staff, increased cost-of-living allowances, and greater construction expenditure not comprised within the building budget. An expenditure of fr. 137,000,000 in respect of new rolling stock is envisaged. Of this amount, fr. 32,300,000 is a charge to the working budget. The profit and loss account for 1949 is expected to close with a credit balance of fr. 2,300,000 after allowing for all statutory commitments.

BELGIUM

Financial Results

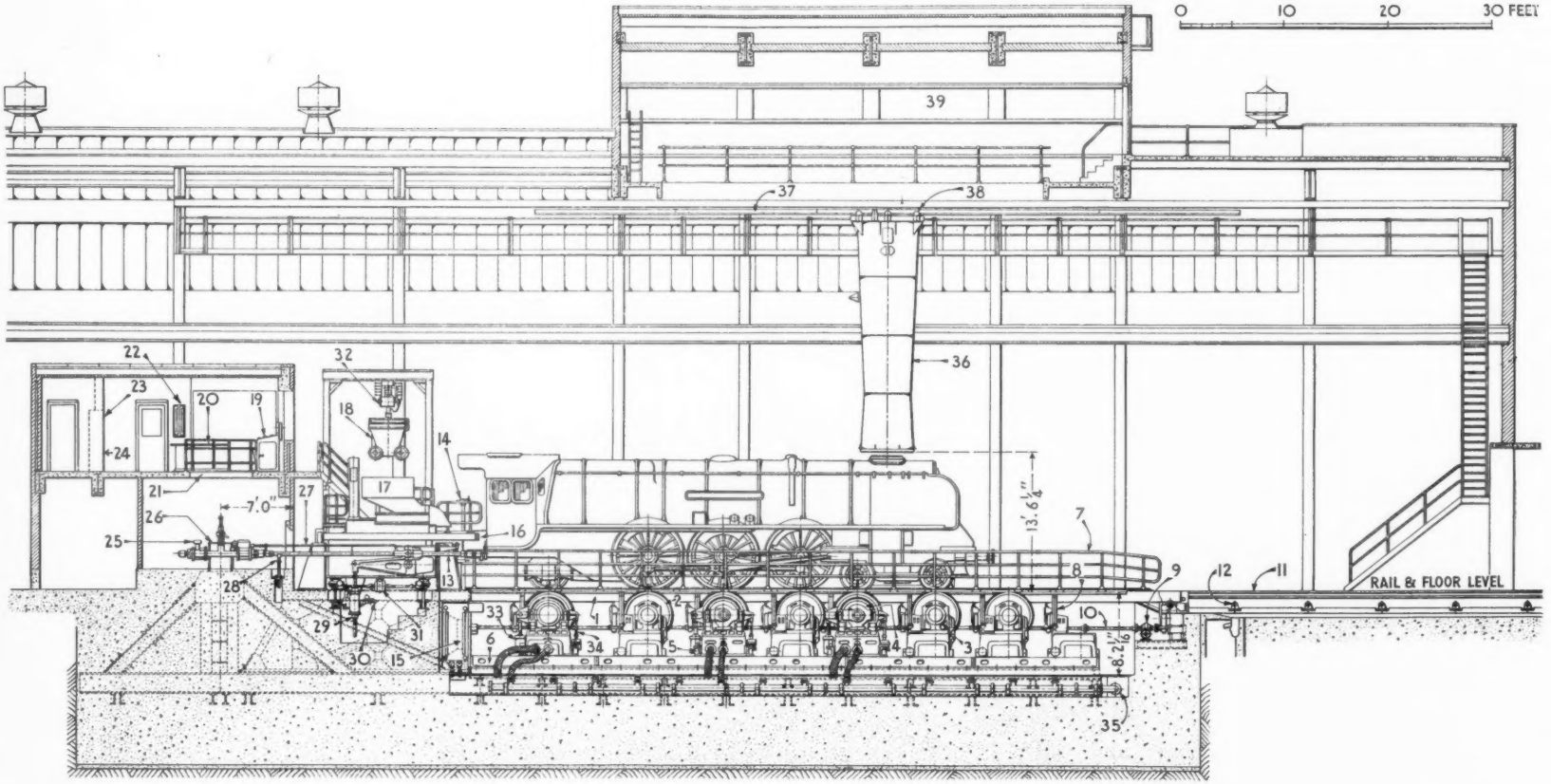
For the first time since before the war the Belgian National Railways Company, in which the State holds 51 per cent. of the shares, will end the year with a surplus over estimates of 85,000,000 Belgian francs. Salary increases of 300 million francs granted during the year, however, will leave an actual deficit of 215,000,000 francs on a total expenditure of 11,500 million francs. It is hoped that by 1949 the deficit caused by the salary increases will be wiped out by a proportionate increase of Government subsidies.

SWEDEN

Railway Nationalisation

In 1939 the Swedish Parliament decided unanimously in favour of nationalisation of the privately-owned railways, and since then 19 of the most important and largest of the then existing 39 private lines have been incorporated into the State Railways. The route-mileage thus added totalled 1,428 miles. There has been growing opposition more recently, supported by conservative influences, against further railway nationalisation. This move, in connection with the coming elections, is reported to be a pointer to the importance of maintaining private interests amidst growing state interference in economic activities. Against this, labour circles maintain that fares and rates on the formerly privately-owned systems have been reduced to the level obtaining on the State Railways, and salaries and wages of the staff and personnel taken over by the State Railways have been increased on an average by Kr. 80 (about £5 10s.) a month.

Rugby Locomotive Testing Station

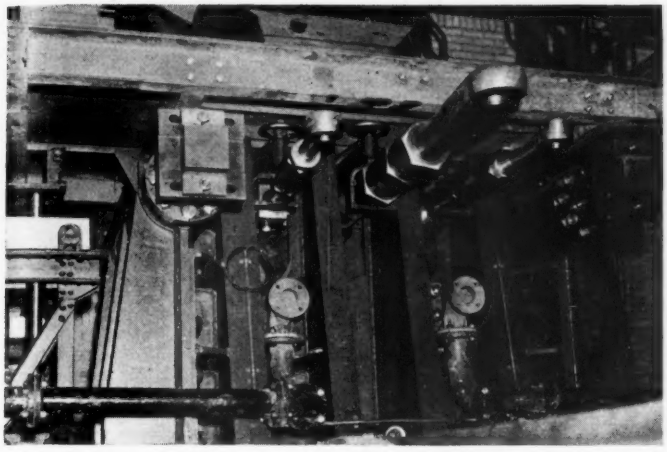


1. Locomotive lifting platform
2. Main drum
3. Drumshaft bearing
4. Dynamometer
5. Dynamometer roller
6. Dynamometer soleplate
7. Removable gangway
8. Crossbeam—gangway support
9. Reduction gear—lifting jacks
10. Operating shaft—lifting jacks
11. Extension rails
12. Rollers—to withdraw lifting platform
13. Main drawbar
14. Boiler feed control
15. Injector overflow measuring tank
16. Firing platform
17. Coal hopper on weighing machine
18. Portable coal truck
19. Dynamometer control desk
20. Amsler recording table
21. Glass panel in floor
22. Boiler feed tank telegages
23. Gas analysis panel
24. Pressure and temperature panel
25. Amsler dynamometer
26. Anchorage H beam
27. Mediating gear
28. Rear drawbar support
29. Damping dashpot
30. Dashpot motor operated needle valve
31. Dashpot carriage elevating gear
32. Electric travelling hoist
33. Dynamometer torque measuring gear
34. Dynamometer dashpot
35. Dynamometer water supply ring main
36. Chimney
37. Chimney sliding plate
38. Chimney rollers
39. Smoke corridor

General arrangement of the locomotive test plant

Rugby Locomotive Testing Station

Origins, layout, and design of British Railways new testing plant



Drawbar of the Rugby testing plant, at which the measurement of power is made by means of an Amsler dynamometer

IT usually has been the practice in Great Britain for locomotive testing to be carried out by the haulage of test trains, when the drawbar pull and other performance features of the locomotive under test, are recorded in a dynamometer car coupled between the engine and its train. This method of testing at variable speeds on ordinary track has produced useful results, though due to the many disturbing factors involved, it cannot ensure that all the scientific data so essential to measuring the efficiency of the locomotive, and to planning the evolution of future designs, are made available on a strictly comparable basis.

The principal limitation is that the results necessarily are averages of all the different conditions of working. Though an attempt may be made to obtain more closely comparable results by setting all the engines under test to haul the same loads, over the same stretch of line, in practice such variable factors as operating schedules, signal checks, curves and gradients and variations in the weather, tend to introduce a lack of uniformity as between one test run and another, which makes it difficult to obtain strictly comparable data.

Apart from dynamometer car trials, it is possible, by means of special braking units, to carry out constant speed tests on the road, in which the locomotive can be set to work at a constant i.h.p., by using one pre-determined setting of the steam-regulator and the valve-gear, while keeping the boiler pressure as nearly constant as possible. The ultimate development of this method in Great Britain makes use of mobile testing units (as developed by the former L.M.S.R. and described in our September 5, 1947, issue), which are automatically-controlled electric-braking units that can be set to maintain the speed of the locomotive to within a fraction of a m.p.h. of the desired speed.

Locomotive Laboratory

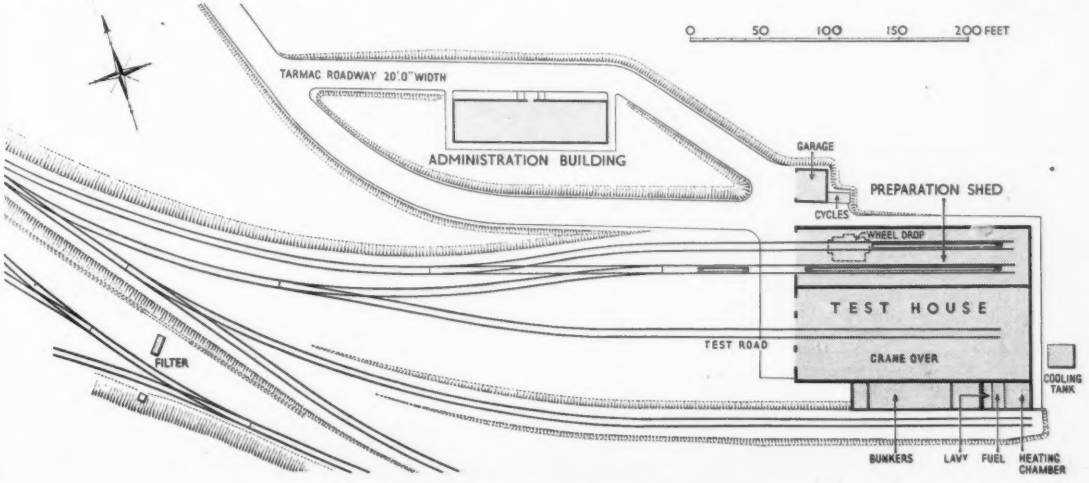
For many test purposes, however, it obviously is of advantage to have the locomotive stationary, so that the apparatus fitted to it can be closely watched at first-hand, and not by the remote observation necessary on the road. As a result, the stationary testing plant has been evolved, in which the locomotive is operated in what is virtually a laboratory, and instead of the locomotive running over the track, the "track" is made to pass under the locomotive. This is accomplished by running the locomotive on rollers fitted with rims of a similar profile to the normal rails.

For a number of years, the former Great Western Railway had possessed a stationary testing plant at Swindon Works that has proved of great value, and due to additional refinements and other equipment now available, the recently-opened Rugby locomotive testing station marks a very considerable advance in the wider application of this method.

The main object of testing on a stationary testing plant, as opposed to testing in ordinary service, or at constant speed on the line, is to make comparisons of the performances of locomotives having some distinguishing feature, or of one locomotive with or without some special fitting. Such comparisons then can be made without the effect to be investigated being swamped and obscured by a host of uncontrolled variables and irrelevancies.

The testing station makes it possible to obtain far more accurate figures of coal and water consumption for any particular working condition of the locomotive, than can be obtained otherwise, because the test can be continued for the necessary length of time to reduce errors to negligible proportions. For certain information to be obtained, it may be necessary to resort to tests of the same locomotive both on the test plant and on the line. By running a locomotive on the test plant at any given speed and setting of the controls, a figure can be obtained for its hourly consumption of coal and water as well as a figure of i.h.p. and h.p. at the wheel rim, though this latter is not the actual d.b.h.p., which represents the engine's train-hauling capacity. Fuel and water consumption should not be seriously different when running on the line, and such difference as there may be can be determined by a few special tests on the line, when the actual power output, at the drawbar, also can be measured for the same speed and control settings as used at the testing station.

Detailed investigation into problems of combustion and heat distribution in locomotive boilers, which it would be quite impracticable to carry out on the line, now can be undertaken at the testing station.



Site plan of the new testing station at Rugby

The locomotive testing station at Rugby owes its inception mainly to the persistent advocacy of Sir Nigel Gresley, whose proposal for a national locomotive testing station, for the benefit of all concerned with the design, construction or operation of locomotives, was first given public expression in his presidential address to the Institution of Mechanical Engineers in 1927.

On the recommendation of the Department of Scientific & Industrial Research and of the four main-line railway companies, a committee was formed in 1928, to examine the possibility of establishing such a testing station, but by the time the committee reported the slump of the early 1930s resulted in the matter being shelved.

Revival of the Project

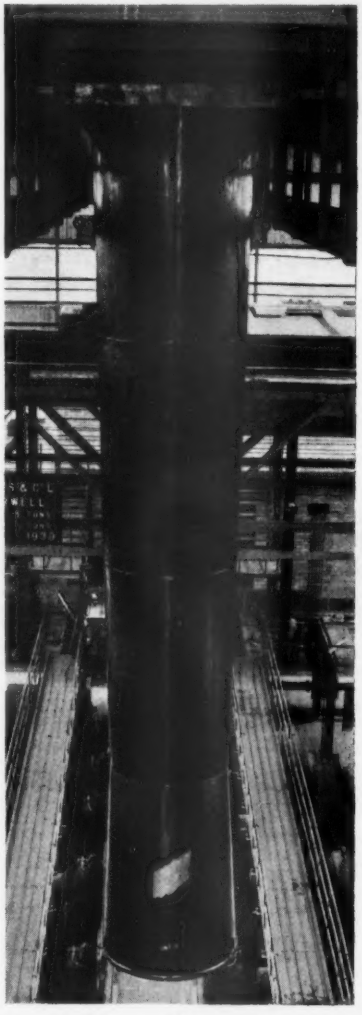
When the proposal was revived in 1934, a new committee confirmed the findings of the former committee on the desirability of establishing a testing station, but not all the former participants felt able to contribute to the cost, and in 1936, the L.M.S.R. and L.N.E.R. companies decided to proceed jointly with the construction of a testing station for their own use, although they were prepared to make it available to other users when not actually required by either of these companies.

In 1937, there were established both a superintending committee, composed of directors and chief officers of both companies, and a management committee, consisting of the two chief mechanical engineers, whose purpose it was to prepare final designs, construct, and in due course, manage the testing station. At the same time, a superintending engineer was appointed to control the station's activities and to be responsible to the management committee, which then consisted of Sir Nigel Gresley (L.N.E.R.) and Mr. (now Sir William) Stanier (L.M.S.R.). With the support of these two chief mechanical engineers, Mr. R. C. Bond, the first Superintending Engineer, who is now Chief Officer (Locomotive Construction & Maintenance, of the Railway Executive), proceeded with the design of the station, a site for which had been selected at Rugby, adjacent to the motive power depot, and the locomotive repair shop of the L.M.S.R. This site was chosen as being easily accessible from that company's main line, over which the heaviest locomotives could be brought to the testing station, and also as being reasonably accessible from London and from most of the main locomotive works of either company. The Great Central Section main line of the former L.N.E.R. passes close to the site at a higher level, and a direct connection to the station from this line was envisaged.

The architectural design and construction of the buildings were undertaken by the Chief Civil Engineer's Department of the L.M.S.R. and at the outbreak of war, work was well advanced. It was decided to make the buildings weatherproof and to suspend all other work for the duration. Accordingly, work at the site stopped early in 1940, and the project remained in abeyance until 1944. In that year, the first steps were taken to revive the scheme with the appointment of the late Mr. D. W. Sanford as Superintendent Engineer, who had to relinquish his post for reasons of health early in the present year, and was succeeded by Mr. D. R. Carling.

The testing station stands on a site of some 7¼ acres and consists of two buildings with rail and road approaches. The larger building comprises the test house, adjacent preparation shed, coal bunker annexe, and foreman's office and mess-room, the two latter being over the boiler room of the heating installation. The smaller building houses the offices and the chemical laboratory, and though near the main building, is sufficiently separate to be free of noise and vibration.

The testing plant consists of seven pairs of rollers, which support the locomotive, and up to five of which are driven by the coupled wheels of the engine. Each of these five pairs of rollers is coupled to a Froude hydraulic brake or dynamometer capable of absorbing up to 1,200 h.p. and designed for a maximum speed equivalent to 130 m.p.h. The capacity of the whole plant, however, is rated at 4,500 h.p., capable of being increased to 6,000 h.p., should this ever be required. Each roller unit has been designed to carry an axle load of 30 tons, so that ample provision has been made for any foreseeable increase in the size and power of British locomotives.



Movable chimney for locomotive exhaust

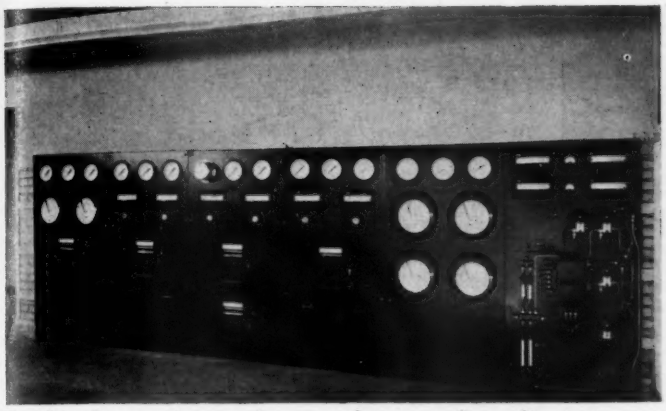
The characteristics of the Froude dynamometer are such that, for any one setting of the controls of the locomotive and of the brake, the combination of locomotive and brake is stable for any minor change of power output, only a very small change in speed resulting. The fundamental design of the Froude dynamometer is such that torque increases and decreases as a function of speed, and so provides the dynamometer with valuable self-governing properties which assist in the maintenance of steady speed, irrespective of any adjustment of the control. This is the reverse of a plain friction brake, which is unstable in combination with a locomotive, and thus requires constant vigilance at the controls.

With the Froude dynamometer, a locomotive can be tested at any speed above 19 m.p.h. The upper limit of power absorbed is governed by the permissible rise in temperature of the water circulating through the brakes, and to keep the water consumption within reasonable bounds, this water is passed through a cooler of Heenan & Froude Limited pattern and re-circulated through the brakes. Within normal climatic variations, the cooler will dissipate energy equivalent to a power of 4,500 h.p., the inlet and outlet temperatures being about 140° and 100° F. respectively, with a maximum water flow of 30,000 gal. per hr.; a percentage of this is evaporated in the cooler and made up by an additional supply.

In this instance, the Froude dynamometers are not only used as brakes to control the speed of the locomotive, but also are provided with arms which transmit the torque load to a spring. The deflection of this spring is electrically transmitted to the control room, where the torque transmitted by each driving wheel is indicated as tractive effort at each axle. Each dynamometer can be controlled separately, or all can be operated together, by means of a master control. This enables the load on all driving axles to be increased, or decreased, together, or the separate loads on each driving axle may be altered separately. Measurement of the power of the locomotive finally is made at the drawbar, by means of the Amsler dynamometer, as used in many railway dynamometer cars.

The pull exerted by the locomotive is applied to the piston of a hydraulic cylinder, the pressure in which both is shown on a gauge, calibrated to read directly in thousands-of-pounds-pull, and is recorded by means of a small hydraulic cylinder and piston connected to an accurately calibrated spring and to a pen. The hydraulic cylinder is mounted on a heavy vertical steel joist, which is strongly braced to the large steel grillage forming the basis on which the whole plant is mounted. This grillage contains some sixty tons of steel girders and is embedded in a concrete block about 103 ft. long, by from 17 ft. to 41 ft. wide and from 6 ft. to 17 ft. thick, weighing roughly 3,000 tons. As there was a possibility that vibration from this foundation would be transmitted to the building structure, special steps were taken to isolate the latter.

The main building of the locomotive test house, which is 171 ft. long by 66 ft. 6 in. wide, is supported by a welded-steel rigid frame. The design of the structure is somewhat unusual, as not only had it to support a crane, but a continuous slot was required at the crown for the emission of smoke into the smoke chamber, and the latter—a heavy concrete structure—had to be carried at this point. To reduce the load on the frame as much as possible, the roof covering consists of glazing and protected metal; the metal is carried down the side walls to a point where it meets the brickwork surrounding the lower portion of the structure. The adjacent preparation shed is 170 ft. long by 41 ft. wide, and has two tracks equipped with inspection pits, and with a 35-ton



Panel in the control room, showing indicating and recording instruments

wheel-drop, capable of handling the largest locomotive driving-wheels, so as to render the testing station independent of outside assistance, should it be necessary to remove a locomotive axle.

The main test house also contains an internal two-storied building of brick construction, the upper floor of which contains the control room, where the majority of the recordings are made. This room is specially soundproofed and has double windows and doors, as the noise level in the main part of the building is likely to be very high when a full-power test is in progress.

In the control room there are situated the Amsler recording table, where the drawbar-pull is recorded on a moving paper (driven from the wheels of the locomotive by means of a Selsyn electric transmission); the control desk, whence all the brakes and most of the other parts of the plant's machinery are controlled; the recording instruments for temperatures of flue gases, inlet and exhaust steam, feed water, and so on; the boiler, steamchest and exhaust pressures, the smokebox, firebox and ashpan vacua; and the instruments for continuous analysis of the smokebox gases. All these indicating and recording instruments are located on a panel on one wall of the room.

The Amsler recording table, which is generally similar to that in a dynamometer car, not only records the actual pull of the locomotive, but also has integrating devices to obtain and record the work done and the power developed, as well as the actual speed.

It is also equipped with a number of additional pens whereby any desired feature of the engine working can be recorded at will by an observer on the locomotive footplate.

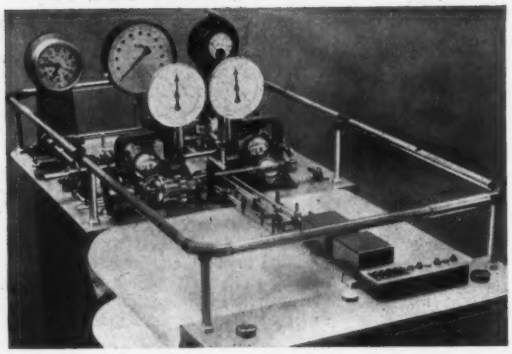
Before a locomotive can be placed on the test plant, the plant must be prepared to suit its particular dimensions. The roller units and brakes must be adjusted to suit the wheel spacing of the engine, the drawbar adjusted in length and height to suit the dragbox, and the firing platform, which replaces the tender while the locomotive is on the plant, adjusted in height to suit the footplate of the locomotive. To allow for these adjustments, all the relevant parts have to be made mobile.

The roller units and brakes can be traversed along sole-plates, which are founded on the steel grillage already mentioned, each unit being provided with a motor-driven pinion working on racks covering the whole length of the sole-plates. Once correctly placed, the rollers are firmly clamped by large holding-down bolts. The units are first set to the nominal dimensions of the locomotive, and then are checked and re-set more accurately by means of a special device originally developed at the locomotive testing station of the French National Railways at Vitry-sur-Seine. This device can be used either with the locomotive wheels stationary, or with them revolving at moderate speed, and is capable of indicating errors of centring of about 0·01 in. Similarly, the drawbar can be raised and lowered by means of a motor, as can the whole of the Amsler hydraulic dynamometer. This is complicated by the fact that a large damping dash-pot has had to be incorporated between the drawbar and dynamometer, to prevent excessive vibration arising from resonance of the elastic system composed of the drawbar itself and the mass of the locomotive. Although the movement would be small, such syn-

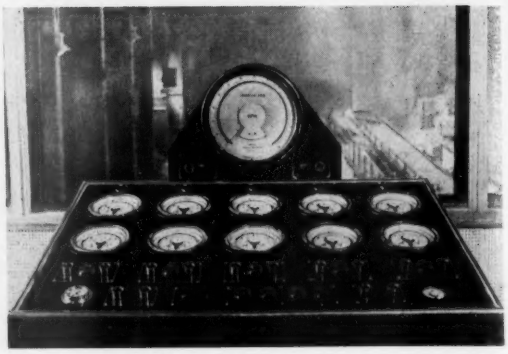
(*Continued on page* 503)

Interior of the testing plant building, looking towards the control room

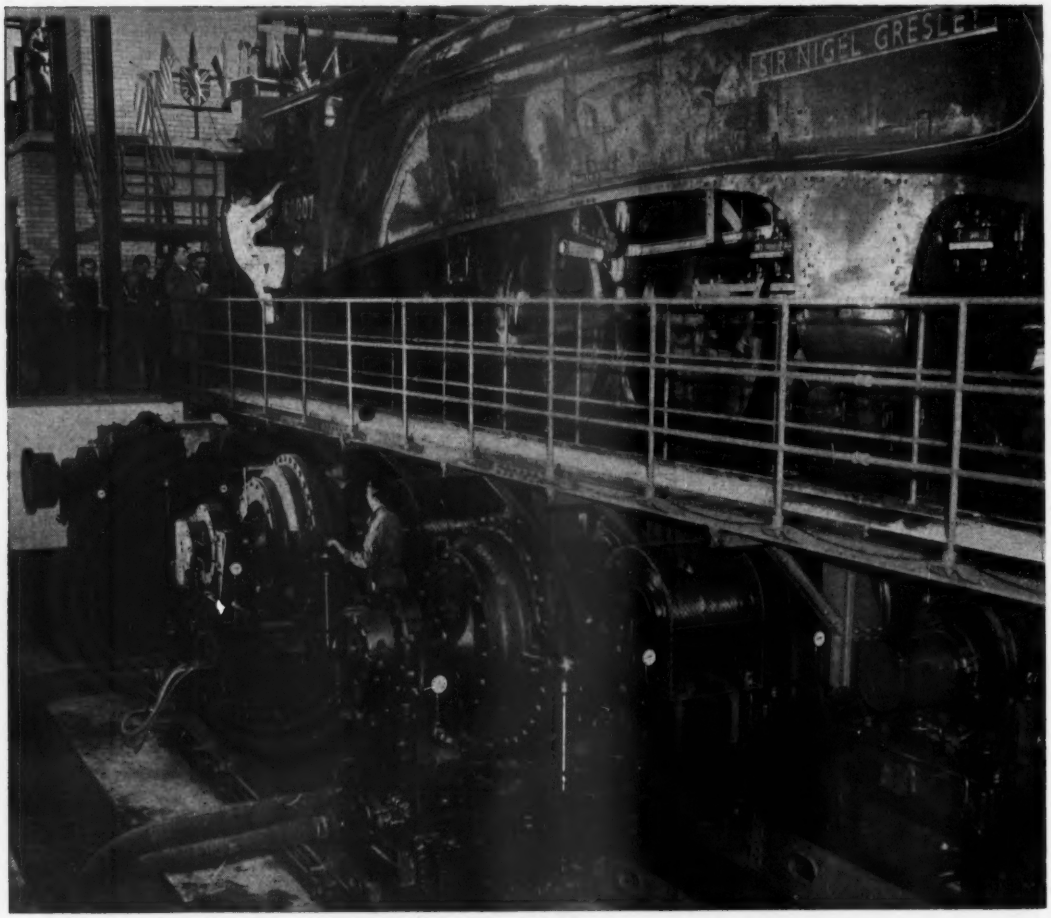
Rugby Locomotive Testing Station



Recording table in the control room, where drawbar-pull and other measurements are recorded automatically



Control desk, from which the Froude hydraulic dynamometer and other machinery are controlled



Pacific locomotive No. 60007 "Sir Nigel Gresley" on the Rugby test plant

RAILWAY BENEVOLENT INSTITUTION.—At its meeting on October 22 the board of the Railway Benevolent Institution granted annuities to 22 widows and 12 members amounting to £584 4s. per annum, and two gratuities to widows amounting to £20, and authorised 41 grants amounting to £344 7s. from the special benevolent fund in cases of immediate necessity. Grants made from the casualty fund during September amounted to £417 12s. 6d.

NEW FREIGHT WAGONS FOR THE PENNSYLVANIA RAILROAD.—One hundred new heavy duty gondola freight wagons, the first of an order for 2,000, are being turned out of the Altoona Works of the Pennsylvania Railroad for immediate service in carrying steel products and large shipments of many kinds. They are all of 70 tons capacity; and 1,400 are 52 ft. 6 in. long inside, with solid ends; 500 are 65 ft. 6 in. long inside, for shipments of unusual length, with drop ends; and 100 are 46 ft. long inside, with high sides which adapt them for certain types of freight, such as pipes and scrap iron.

Repair of Flood Damage on the Scottish Borders

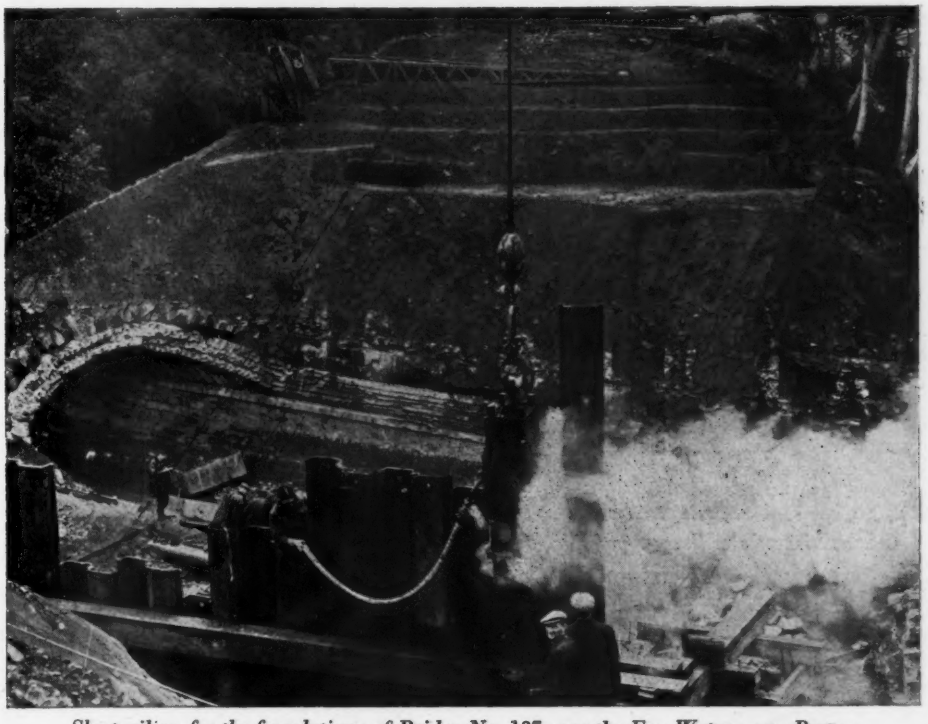
Restoration of through services between Berwick and Edinburgh

NEARLY eleven weeks after it was severely damaged by some of the worst floods within living memory, the East Coast Anglo-Scottish main line was re-opened, for freight traffic, between Berwick and Dunbar, on Monday, October 25. Passenger traffic is to be resumed on November 1. The full resources of British Railways, in personnel and materials, were made available for the work of restoring direct communication between Berwick and Edinburgh, and valuable technical assistance was rendered by the War Department, the Metropolitan Water Board, and other authorities. Although the Great North Road runs at no great distance from the railway, difficulty was experienced in bringing materials and plant to some of the sites, and the preliminary work included the construction of special approach roads.

Replacement of Bridges

One of the most formidable tasks was the replacement of the seven bridges over the Eye Water. This river rises in the Lammermuir Hills, and pursues a meandering course, beside the railway, for about five miles, between Grantshouse and Reston. Five of the bridges were of the masonry arch type, but two were wrought-iron girder structures. The average span was about 30 ft., and the height from normal water level to the soffit of the arch, or the under side of the girders, varied from 8 ft. to 24 ft. In every case, the abutments and wing walls were of masonry. Such was the volume of the flood water, that not only were the bridges demolished, but long sections of the adjoining embankments were washed away, leaving gaps of 120 to 150 ft. across the river.

To expedite the re-opening of the railway, it was decided to use temporary military type bridges, and to leave the provision of permanent structures until a later date. As a precaution against scour during the winter months, when a heavy flow of water must be expected in the river, the concrete foundations of several of the steel trestles of the temporary bridges are protected by coffer dams of sheet piling, and in some cases, the trestles are carried on timber piles. The temporary structures are considerably longer than the original bridges, and have several spans.



Sheet piling for the foundations of Bridge No. 137 over the Eye Water, near Reston

The materials for the temporary bridges were forwarded from a central supply depot at Darlington to railhead in the goods yard at Tweedmouth, near Berwick, whence they were despatched by road to the sites in building sequence. This transport was undertaken by road haulage contractors. Some 2,300 tons of steelwork were handled at Tweedmouth, and about 120 tons were despatched daily, during the peak period. This depot also dealt with plant for the contractors; but timber for the works was despatched direct to the sites by road.

Floods at Grantshouse

At Grantshouse, the Eye Water overflowed on to the railway, immediately east of the station, and inundated the track to a height of at least 2 ft. above the platforms. This breach has been made good with sheet piling and filling. From the station, the water flowed westward along the track to Penmanshiel Tunnel (12 ch. long), which was flooded to within 4 ft. of the crown, but did not suffer serious damage. The tunnel stands at the summit of a gradient of 1 in 96, which extends for over four miles, past Cockburnspath Station, down the valley of the Pease Burn. The burn passes under the railway in a syphon, near the west end of the tunnel.

The overflow from the Pease Burn, and the spillage through the tunnel from the Eye Water, poured down the track, tearing up the ballast, and bursting the permanent way drains. Two landslides, and a series of slips and washouts, occurred on this section, in a distance of less than two miles. In some cases, the rails were left suspended over huge gaps in the embankment, and thousands of tons of filling were required to make good the damage. Much of this material was taken from land adjoining the railway with drag lines and bulldozers. Sheet piling was used at one point, to protect the toe of the bank from the scouring action of the burn. Near the 38½ mile post, a slip carried away an accommodation underbridge, but the landowner agreed that it should not be replaced.

Embankment at Ayton

Some two miles west of Ayton, the collapse of a culvert, which carried the Horn Burn (a tributary of the Eye Water) under the railway, impounded a huge volume of water against a 52-ft. embankment. For several days it was feared that the dam would burst, and that the town of Eyemouth would be inundated. Part of the water was released by cutting a trench, fitted with sluice gates, through the embankment, but the work had to proceed slowly, as the embankment had been weakened. Pumps were obtained from the Metropolitan Water Board, and two 9-in. pipes were laid, over rising ground, to a smaller culvert, which had withstood the flood. Similar pipes were laid subsequently, across the high railway embankment, to enable water to be discharged

into the channel of the Horn Burn. The temporary drainage trench has been carried down to the foot of the embankment to act as a by-pass for the waters of the burn during the construction of a new culvert on the original site. The railway is carried over this trench on a military-type bridge with a span of 35 ft. The new culvert is to be built between two rows of sheet piling. As the newly-tipped embankment is not fully consolidated, the temporary bridge over this excavation is founded on piles.

Slips at Burnmouth

Some four miles south of Ayton, between Berwick and Burnmouth, the railway runs close to the sea, at a height of some 150 ft. above the foreshore. Two serious slips occurred on this section. In one case, it was decided to drive sheet piles in the 6-ft. way, down to rock level, and to tie the piles to concrete anchors in the down cess with lengths of old rail. The up road is to have a concrete foundation, 15 ft. wide, carried down to solid rock, some 27 ft. below rail level. At the second slip, the track has been slewed 8 ft. back from the cliff face, and it is proposed to construct a concrete wall down to a solid foundation on the seaward side.

The contract for the earthworks between Cockburnspath and Penmanshiel tunnel, and the three bridges over the Eye Water nearest to Grantshouse, was let to Sir Robert McAlpine (Scotland) Limited; and Balfour Beatty & Co. Ltd. were responsible for the remaining bridges, and the two slips at Burnmouth. The works at Ayton, and repairs to three bridges between Cockburnspath and Dunbar, which suffered only slight damage, were carried out by Ivan Tait, an Edinburgh firm of contractors. The contractors employed about 550 workmen, many of whom were accommodated in 22 railway vehicles, which were converted into dormitories and messrooms.

Every effort has been concentrated on restoring the main line, and the re-opening of the seriously-damaged branch lines in the area has had to be postponed. On the Gifford branch, an 18-ft. arch over the Birns Water, near Humbie Station, collapsed, and at Fountainhall, one of the wing walls of the masonry bridge, which carries the Lauder branch over the Gala Water, was demolished. Both these branches were closed to passengers several years ago, but remained open for goods traffic. The branch from Burnmouth to Eyemouth crosses the Eye Water on a high viaduct of six 50-ft. wrought-iron spans, supported on brick piers. The centre pier was undermined and collapsed, but the girders were not dislodged.

The cross-country line from St. Boswells to Reston suffered serious damage in several places. At Greenlaw, the two-span girder bridge over the Blackadder Water was demolished, and the embankment heavily scoured. Near Duns, the 10 ft. masonry arch over the Langton Burn was swept away, and the collapse of a culvert caused an extensive slip on the embankment. The high five-span masonry viaduct over the Whiteadder Water, at Chirnside, withstood the flood, but four of the six spans of the bridge carrying the siding to the nearby paper mill were demolished, and the track, with the sleepers still in position, were swept aside.

Construction of a military-type bridge over the Eye Water, between Grantshouse and Reston

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LONDON TRANSPORT ANTI-FREEZE NETWORK COMPLETE.—An anti-freeze network covering the whole of the open sections of the London Transport Underground system will be ready next month for the first hard frost of the winter. Throughout the summer, workers have been installing hundreds of small "anti-freeze machines" on the Underground tracks. The machines are small baths let into the current rails at about half-mile intervals. They are topped up daily with anti-freeze liquid and are equipped with a rubber wheel which transfers the liquid to the current pick-up shoes of passing trains and thence to the rail itself. The formation of ice on current rails, with resultant collection current troubles, is thereby largely obviated. The machines are switched on and off in accordance with special weather forecasts received daily at 6.0 p.m. by London Transport. Anti-freeze machines were successful last winter when only the Bakerloo Line and some sections elsewhere were equipped. Since then the anti-freeze network has been extended to the whole system, including the Piccadilly Line, District Line, Northern Line, and Central Line.

RAILWAY WAGE CLAIM.—It was decided on October 26, after a two-day meeting of the executive committee of the N.U.R. in London, to call a special delegate conference to consider the replies of the three Executives to the union's application for a 12s. 6d. a week wage increase for 46,000 railway workers. A claim by 24,600 outside railway workers for an additional allowance of 4s. a week for meals, and "the added inconvenience of being on call at any time," has been rejected by the Industrial Court. The court decided they should be paid a daily meal allowance of 1s. 6d. when required to work outside their district; the various districts were to be defined and the allowance would then come into effect.

BRAZILIAN TRANSPORT EXPROPRIATIONS.—It is understood that the findings of the Ministry of Public Works regarding the Leopoldina Railway will be completed this month. The representative of the Ceara Tramways Company was received recently by the Minister of Agriculture and lodged a petition for indemnity for the expropriation of the company's undertaking. The petition was immediately passed to the "Divisao de Aguas." It is presumed in London that this "water division" is in charge of hydro-electric power, and hence of electricity undertakings generally. The recent Ceara Tramways expropriation was of the company's electricity plant.

Repair of Flood Damage on the Scottish Borders

Sheet piling and foundations for a temporary bridge near Grantshouse

Preparing the site for a temporary bridge over the Eye Water

Repair of Flood Damage on the Scottish Borders

Floods near Ayton, showing the mobile pumps and the pipe lines laid over the railway embankment

One of the slips on the embankment above the Pease Burn, between Cockburnspath and Grantshouse

RAILWAY NEWS SECTION

PERSONAL

The board of the British Electric Traction Co. Ltd. announces that Mr. Patrick Lyons Fleming has been appointed a Director of the company. He is Chairman of the Union Commercial Investment Co. Ltd., and of the Nitrate Railways Co. Ltd., and a Director of the Central Uruguay Railway Co. of Monte Video Ltd., and of other companies.

The Lord Chancellor has nominated Mr. Justice Lewis to be *ex-officio* Commissioner for England under the Railway & Canal Traffic Act, 1888.

Sir Robert Letch (a member of the Docks & Inland Waterways Executive) has been elected a Vice-President of the Institute of Transport.

On account of ill health, Sir Clarence Sadd has resigned his seat on the board of the Midland Bank Limited.

Mr. D. W. Harrison, District Goods & Passenger Manager, Nottingham, Eastern Region, British Railways, has retired, after 46 years' railway service, 22 of which were as District Manager, Nottingham.

Sir Stephen Pigott, after 40 years continuous service with the company, has, on account of ill health, tendered his resignation from his position as Managing Director at Clydebank of John Brown & Co. Ltd., as from October 31, but will remain a Director. Dr. James M. McNeill, at present Deputy Managing Director, will become Managing Director at Clydebank.

We regret to record the death on October 20 of Mr. Charles Henry Croasdaile Bowen, who in 1938 proceeded on leave preparatory to retirement from the position of Chief Engineer, Madras & Southern Mahratta Railway.

Photo] [Lafayette

Captain W. Gregson

President, Institution of Mechanical Engineers, for 1948-49

The executive committee of the British Iron & Steel Federation announces the resignation of its Commercial & Technical Director, Sir John Duncanson, who is returning to Scotland to be associated in certain interests with Sir James Lithgow. He will be succeeded as Commercial Director of the Federation by Mr. Edward W. Senior, Master Cutler of Sheffield for 1948. The changes will be effective from early in 1949.

Sir Eustace Missenden, Chairman of the Railway Executive, and Mr. J. C. L. Train, Member of the Executive responsible for civil engineering, visited Scotland on October 26 to inspect the repairs carried out on the East Coast main line between Berwick and Dunbar, and on neighbouring branch lines, subsequent to the severe damage by storms and floods. During their tour they met engineers, contractors and staff; and after conferring with officers of the Scottish Region they returned from Edinburgh to London.

Captain (E) W. Gregson, R.N.R., M.Sc.(Eng.), M.I.C.E., M.I.Mech.E., M.I.N.A., M.I.Mar.E., who is President of the Institution of Mechanical Engineers for 1948-49, served on the Transportation side of the Royal Engineers in the 1914-18 war, and after demobilisation became Chief Engineer of Spencer-Bonecourt Limited. Later he was appointed Manager of the Marine Department of Babcock & Wilcox Limited. While chiefly engaged in marine engineering work, he is also actively concerned as a Director of the following Babcock & Wilcox subsidiaries:—Spencer-Bonecourt Limited; Edwin Danks & Co. (Oldbury) Ltd.; and Clarkson Boiler Co. Ltd. He was appointed a Captain (E) in the Royal Naval Reserve for his work in the recent war.

We regret to record the death on October 22, at the age of 79, of Sir Peter Rylands, Bt., one of the founders, and President from 1919-21, of the Federation of British Industries, and a former President of the Iron & Steel Institute.

"Office Vaudois du Tourisme"

The eleven prominent members of the "Office Vaudois du Tourisme" and Swiss Federal and Cantonal Governments, who recently arrived in London on a goodwill mission, gave a cocktail party at the Dorchester Hotel on October 26 to members of the British Press. The guests were received by Mr. H. Guhl, Chairman, "Office Vaudois du Tourisme." A list of the members of the delegation was given in our October 15 issue, page 445.

Subsequent to the resignations from the board of Murex Limited, of Mr. E. H. Armitage, who is now resident abroad, and Sir Shirley Worthington-Evans, owing to pressure of legal work, Mr. H. C. Green, of the company's Rainham works, and Lt.-Colonel J. F. Todhunter, of Murex Welding Processes Limited, have been appointed Directors of the company.

Following Mr. M. F. Coop's appointment as Secretary, Dunlop Rubber Co. Ltd., Mr. H. D. B. Eaden has succeeded him as head of the company's legal department.

The names of the members of the committee to inquire into costs and workings of Government public relations services were officially announced recently, as follow:—Sir Henry French, Chairman; Mr. A. P. Ryan, Assistant Editor of *The Times*; Mr. J. I. C. Crombie, Treasury; Mr. E. M. Nicholson, Lord President's Office; Mr. S. A. Bailey, Ministry of Transport; and Mr. J. Littlewood, Treasury (Secretary to committee).

As a compliment to Mr. W. P. Allen, C.B.E., Member of the Railway Executive, the name *W. P. Allen* is being given to the first of the improved type of "A1" Pacific locomotives recently completed at Doncaster Works. Mr. Allen was for a number of years employed at the Hornsey Locomotive Depot of the former Great Northern Railway successively as cleaner, fireman and engine-driver. Sir Eustace Missenden, O.B.E., Chairman of the Railway Executive, undertook to preside at and perform the naming ceremony, which was to take place yesterday at No. 13 platform, Kings Cross Station.

Anglo-American Council on Productivity

After final adjustments, the Anglo-American Council on Productivity, the first meeting of which took place on October 25, consists of:—

U.S.A.: Messrs. Philip D. Reed (Chairman of U.S. Section), Ernest R. Breech, Harvey W. Brown, Thomas J. Harkins, J. Spencer Love, Lee W. Minton, Ira Mosher, Victor Reuther.

U.K. (the employers' representatives consist of nominees of the Federation of British Industries and the British Employers' Confederation): F.B.I.:—Sir Frederick Bain, Mr. A. R. Baines, Sir Peter Bennett, Sir Maurice Denny; B.E.C.:—Sir Greville Maginness, Mr. C. B. Clegg, Sir John Forbes Watson; Trades Union Congress:—Messrs. Lincoln Evans, Arthur Deakin, Will Lawther, Andrew Naesmith, Jack Tanner, Tom Williamson.

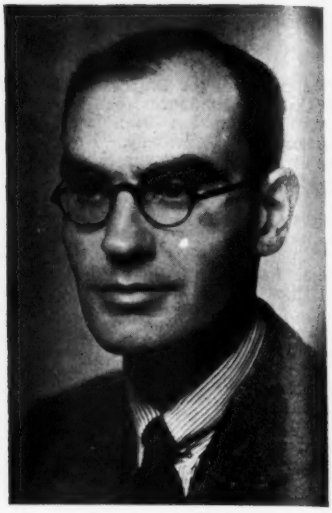
The Joint Secretaries are Mr. Stanley A. Holme (U.S.); Sir Norman Kipping (U.K.), Mr. Vincent Tewson (U.K.).

Mr. A. J. White

Appointed Assistant Chief Regional Officer, Eastern Region, British Railways

Mr. C. F. Beck

Appointed Assistant to Chief Commercial Manager (Goods), L.M. Region, British Railways



Mr. D. R. Carling

Superintending Engineer, Locomotive Testing Station, British Railways, Rugby

Mr. A. J. White, Advertising Officer to the Railway Executive, who has been appointed Assistant Chief Regional Officer, Eastern Region, British Railways, in succession to Mr. A. E. H. Brown, appointed Chief Docks Manager for South Wales, Docks & Inland Waterways Executive, was educated at Bedford Modern School and joined the Great Northern Railway at Peterborough in 1913. During the 1914-18 war, he served with the Artists' Rifles, and was commissioned to the Northamptonshire Regiment. When the Traffic Apprenticeships scheme was inaugurated in the Southern Area of the L.N.E.R. in 1923, Mr. White secured the first place by examination and after periods of training in the commercial, operating and locomotive running departments, held a succession of posts in the Eastern Counties, at Edinburgh and at York, before entering the Chief General Manager's Office in 1929, as Assistant to the Industrial Agent. Mr. White was appointed Commercial Advertising Agent to the L.N.E.R. in 1933. From 1940, he was closely associated with the formation of Home Guard units and later commanded the 17th City of London Battalion, H.G. He became Chief of Police, Southern Area, L.N.E.R., in January, 1943, and Advertising Manager, L.N.E.R., in July, 1945. Since the beginning of this year, Mr. White has been working, under General Sir William Slim, as Advertising Officer to the Railway Executive and vacates this post on taking up his new appointment.

Mr. C. F. Beck, who, as recorded in our September 24 issue, has been appointed Assistant to the Chief Commercial Manager (Goods), London Midland Region, British Railways, entered the service of the Midland Railway in 1908 in the Goods Department at Nottingham. He was transferred to the Chief Goods Manager's Office, Derby, in 1911, where he worked in the Claims Office until August, 1914, when as a Territorial he was mobilised for military service. He was in France from early 1915 until June, 1919, and was awarded the Meritorious Service Medal. On demobilisation he returned to the Chief Goods Manager's Department, Midland Railway, and after the amalgamation was transferred to Euston, in 1925, where he served in several offices of the Chief Goods Manager and Chief Commercial Manager, L.M.S.R. In 1934 Mr. Beck went to the District Goods & Passenger Manager's Office, Derby, and in January, 1939, was appointed Goods Agent, Burton. He afterwards became Goods Agent, Aston, which position he left in March, 1943, to take up that of Assistant District Goods & Passenger Manager, Leicester. In August, 1945, he was appointed Assistant District Goods Manager, Birmingham, which post he vacates on his new appointment.

Mr. R. I. Spencer, Assistant in the Office of the Divisional Operating Manager (Motive Power), Derby, London Midland Region, British Railways, has been appointed Assistant Motive Power Superintendent, North Eastern Region.

Mr. C. G. Reddington, Assistant District Engineer, Stratford, Eastern Region, British Railways, has been appointed District Engineer, Ipswich, in succession to Mr. J. R. Dallmeyer, appointed District Engineer, Hull, North Eastern Region.

We regret to record the death on October 21, at the age of 49, of Mr. F. C. Mannox, Managing Director of Murex Limited.

Mr. D. R. Carling, M.A. (Cantab.), A.M.I.Mech.E., M.I.Loco.E., Superintending Engineer of the Locomotive Testing Station, Rugby, which was formally declared open on October 19 by the Minister of Transport, was born in 1906, and is the second son of Sir Ernest Rock Carling, the distinguished surgeon. Educated at Oundle School and Zurich, Mr. Carling was a scholar of Trinity Hall, Cambridge, 1925-28, and served his engineering pupilage with Beyer, Peacock & Co. Ltd., Manchester, from 1928 to 1931. After some experience in general engineering and experimental work, he joined the L.N.E.R. in the Material Inspection & Testing Department at Darlington, and mainly was attached to the dynamometer car office. After further experience in the locomotive works and at Kings Cross shed, Mr. Carling was selected by the late Sir Nigel Gresley as Assistant to Mr. R. C. Bond, the first Superintending Engineer of the joint L.M.S.R. and L.N.E.R. locomotive testing station. In preparation for this post, visits had been made to the locomotive testing stations at Altoona, Pennsylvania, at Grunewald, near Berlin, and Vitry, near Paris, though, as a result of the outbreak of war in 1939, the appointment was not taken up. The L.N.E.R. lent Mr. Carling to the Admiralty, as a Temporary Experimental Officer, and he worked on the protection of ships against magnetic mines from 1939 to 1942, and subsequently on torpedoes, being stationed at Portsmouth, Helensburgh and Greenock; later he was commissioned as Lt.-Commander (Sp), R.N.V.R., for duty overseas. On demobilisation he returned to the L.N.E.R. early in 1946, as Assistant Chief Test Inspector, North Eastern Area, and in July, 1946, was appointed Chief Test Inspector, which post he held until his present appointment.

Mr. H. A. Price-Hughes, A.M.I.E.E., Manager of the Publicity Department of the British Thomson-Houston Co. Ltd., retires at the end of this month, after 44 years' service with the company, but will remain available for consultation. He is succeeded as Manager by his deputy, Mr. C. H. Chaplain. Mr. Price-Hughes joined B.T.H. in 1904. In 1911 he undertook the organisation of the preparation and distribution of the company's technical literature, and formed a new Publication Department, separate from the existing Advertising Department. The latter was merged in the Publication Department in 1930, and the name changed to Publicity Department. Under his managership the total number of B.T.H. technical publications in current use rose from 55 to over 7,000. For many years he has been Chairman of the A.E.I. Publicity Committee; and he has been a member of the B.E.A.M.A. Publicity Committee since its inception. Mr. Chaplain joined B.T.H. in 1912 and entered the Publication Department in 1913. From 1914-19 he was on active service and was mentioned in despatches. On demobilisation he returned to the B.T.H. Publication Department. During the recent war he served in the Home Guard. He was appointed Deputy Manager of the Publicity Department in April, 1947.

British Railways Locomotive Testing Station

Formal opening by Minister of Transport at Rugby

Mr. Alfred Barnes, M.P., Minister of Transport, on October 19, formally opened the British Railways new locomotive testing station at Rugby. Sir Eustace Missenden, O.B.E., Chairman, Railway Executive, presided at the ceremony, and among those present were:—

Ministry of Transport
Mr. David T. Jones, M.P. (Parliamentary Private Secretary); Sir Gilmour Jenkins (Permanent Secretary); Lt.-Colonel Sir Alan Mount (Chief Inspecting Officer, Railways); Messrs. F. G. Humphrey (Director of Information); B. P. H. Dickinson (Private Secretary to Minister).

British Transport Commission
Lord Rusholme, Mr. J. Benstead (Members); Mr. R. H. Wilson (Comptroller); Mr. S. B. Taylor (Deputy Secretary).

The Railway Executive
Messrs. R. A. Riddles (Member); E. G. Marsden (Secretary); R. C. Bond (Chief Officer, Locomotive Construction & Maintenance); E. S. Cox (Executive Officer, Design); E. Pugson (Chief Officer, Carriage & Wagon Construction & Maintenance); C. M. Cock (Chief Electrical Engineer); Lt.-Colonel H. Rudgard (Chief Officer, Motive Power, Prestdent, Institution of Locomotive Engineers); D. S. M. Barrie (Public Relations Officer).

British Railways (Regional Officers)
Eastern Region
Messrs. C. K. Bird (Chief Regional Officer); A. H. Peppercorn (Chief Mechanical Engineer, Doncaster); J. F. Harrison (Assistant Chief Mechanical Engineer, Doncaster); L. Reeves (Mechanical Engineer, Doncaster); G. A. Musgrave (Locomotive Running Superintendent, Western Section, Liverpool Street); L. P. Parker (Locomotive Running Superintendent, Eastern Section, Liverpool Street); G. Dow (Press Relations Officer, E. & N.E. Regions).

North Eastern Region
Mr. S. A. Finnis (Assistant Chief Regional Officer, representing Mr. C. Hopkins, Chief Regional Officer; Mr. R. A. Smeddle (Mechanical Engineer, Darlington).

London Midland Region
Messrs. G. L. Darbyshire (Chief Regional Officer); S. H. Fisher (Deputy Chief Regional Officer); H. G. Ivatt (Chief Mechanical Engineer); J. W. Watkins (Operating Superintendent); J. Briggs (Civil Engineer); T. M. Herbert (Scientific Research Manager); F. W. Abraham (Motive Power Superintendent); J. O'Neill (Advertising & Publicity Officer); R. L. McIlmoyle (Civil Engineer's Department, Euston).

Local Officers—London Midland Region
Messrs. W. B. Shelton (Divisional Operating Manager, Crewe); M. Saunders (District Operating Manager, Rugby); C. R. Campbell (Assistant Divisional Operating Manager, Motive Power, Crewe); E. Powell (District Goods & Passenger Manager, Northampton).

Scottish Region
Messrs. T. H. Moffat (Deputy Chief Regional Officer, representing Mr. T. F. Cameron, C.R.O.); G. S. Bellamy (Mechanical & Electrical Engineer); R. F. Harvey (Motive Power Superintendent).

Southern Region
Messrs. J. Elliot (Chief Regional Officer); O. V. Bulleid (Chief Mechanical Engineer); T. E. Chrimes (Superintendent of Motive Power).

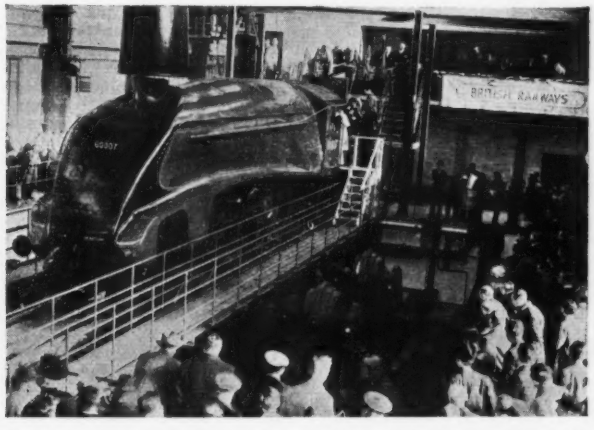
Western Region
Messrs. K. W. C. Grand (Chief Regional Officer); F. W. Hawksworth (Chief Mechanical Engineer); K. J. Cook (Principal Assistant to Chief Mechanical Engineer); W. N. Pellow (Locomotive Running Superintendent).

Management & Superintending Committees Testing Station
Sir William A. Stanier, Messrs. A. K. McCosh, Edward Thompson, O. H. Corble, D. R. Carling (Superintending Engineer).

British Railways Locomotive Testing Committee
Mr. C. S. Cocks (Southern Region, Mechanical Engineer's Department, Brighton); Dr. H. I. Andrews (Scientific Research Laboratory, Derby, London Midland Region); Messrs. B. Spencer (Assistant to Chief Mechanical Engineer, E. & N.E. Regions, Doncaster); R. C. Jarvis (Chief Technical Assistant to Chief Mechanical Engineer, London Midland Region).

Trades Union Representatives
Messrs. W. T. Potter (President, N.U.R.); J. B. Figgins (General Secretary, N.U.R.); J. G. Baty (General Secretary, A.S.L.E. & F.); P. T. Heady (Acting General Secretary, R.C.A.); H. G. Knight (Association of Supervisory Staffs, Executives & Technicians); W. G. Morgan (Chairman (Employees' Side) Station & Yard Local Departmental Committee); J. H. Smart (Secretary (Employees' Side) Station & Yard Local Departmental Committee); D. Campbell (Chairman (Employees' Side) M. Power Depot L.D.C.); G. Waugh (Secretary (Employees' Side) M. Power Depot L.D.C.); J. A. Marlow (Chairman (Employees' Side) M.P. Depot Shop Comm.); C. Kentall (Secretary (Employees' Side) M.P. Depot Shop Comm.); C. Keswick (Chairman (Employees' Side) Loco. Works Shops Comm.); H. S. Pinhorn (Secretary (Employees' Side) Loco. Works Shops Comm.); A. J. C. Reeve (Chairman (Employees' Side) Civil Engrs. Dept. L.D.C.); J. H. Davison (Secretary (Employees' Side) Civil Engrs. Dept. L.D.C.).

Other Guests
M. Louis Armand (French National Railways, Paris); Professor G. Wesley Austin; Messrs. Robert Bonar (Chief Mechanical Engineer, Egyptian State Railways), F. O. Brown (Department of Scientific & Industrial Research), Professor Gilbert Cook, Sir Alfred Egerton, T. Erismann (Alfred J. Amsler Limited), W. H. Gaunt (President, Mansion House Association on Transport); Mr. & Mrs. G. Godfrey (Son-in-law and daughter of the late Sir Nigel Gresley); Mr. Roger Gresley (Son of the late Sir Nigel Gresley); Major H. A. Harrison (Secretary, Inst. Loco. E.), Messrs. Ranald J. Harvey (Consulting Engineer, N.Z. Government Railways), James J. Hughes (Traders' Co-ordinating Committee, F.B.I.), C. F. Klapper (Assistant Editor, *Modern Transport*), J. A. Kay (Editor, *The Railway Gazette*), R. Ling (Messrs. Caffin & Company), J. N. Maskelyne (President, Stephenson Locomotive Society), M. Parmantier (French National Railways, Paris), Mr. C. E. R. Sherrington (Railway Research Service), Sir Frank Edward Smith, Messrs. H. D. W. Smith (Advisory Engineer (London), South African Railways), J. W. Vaughan (Director, Locomotive Manufacturers' Association), R. S. Whipple (Chairman, Cambridge Instrument Co. Ltd.), F. E. Wood (E. Wood & Sons Ltd.).



***Left:** Mr. Alfred Barnes, Minister of Transport, with Sir Eustace Missenden, Chairman, Railway Executive (extreme right), and Councillor T. A. Lord, Mayor of Rugby, inspecting the desk controlling the testing machinery, which is being demonstrated by Mr. D. R. Carling, Superintending Engineer, Locomotive Testing Station. Right: Eastern Region Locomotive No. 60007 running at high speed on the test bed*

A description of the testing station is given on page 491.

Sir Eustace Missenden, in introducing the Minister, referred to the fact that there were also present some of the former railway directors, railway officers and scientific advisers who had given of their zeal and skill in various ways to bring to fruition this important project, with all its great potentialities for the advancement of the locomotive.

He went on to refer to the late Sir Nigel Gresley and to Sir William Stanier, and said they were pleased to be able to pay tribute to the talents of these two

great engineers by using for this occasion the locomotives which bore their names. It was a pleasure to have present Sir William Stanier, and members of the family of the late Sir Nigel Gresley.

Rugby had an important and historic association with railways which went back to the days of the Stephensons; and it was strengthened by the opening of this testing station. The town was already associated with a series of important developments in the fields of radio and electrical engineering, and this new installation would help to enhance its reputation as a centre of industrial progress.

The Railway Executive was confident that this testing station would prove invaluable in the development of the locomotive, and would help British Railways to maintain that leading position which their design and practice had held ever since the locomotive was invented in this country.

Mr. Alfred Barnes said that the development and improvement of British Railways was a matter in which the public took a very keen interest. He knew that the British Transport Commission and the Railway Executive were most anxious to foster public interest in railway affairs.

He congratulated the railway management and staff on the provision of a plant that would enhance the value of national property and contribute to the efficiency of a vital public service. It was appreciated that this scheme owed its inception to two of the former main-line railway companies, the London Midland & Scottish, and the London & North Eastern, which jointly had given authority to build the station in 1937. The question of providing such a station was favourably reported on, some 20 years ago, by a committee set up by the Department of Scientific & Industrial Research under the chairmanship of Sir Alfred Ewing, but the financial depression in the early thirties had prevented the project from being authorised. Work was eventually begun in 1938, but had to be suspended on the outbreak of war.

Realisation of the scheme was a testimony to the persistency of our engineers and more especially to the energies of the late Sir Nigel Gresley, of the former London & North Eastern Railway, and of Sir Harold Hartley and Sir William Stanier, of the former London Midland & Scottish Railway. They all regretted that Sir Nigel Gresley had not lived to see the consummation of this scheme, but it would for ever be a monument to his personality and tenacity of purpose.

Although this testing station thus had been primarily sponsored by two of the former railway companies, it was under the auspices of British Railways that it was now being opened as one of the first major technical installations to become available since nationalisation. It would be used for the advancement of locomotive engineering on the railways as a whole, and he felt sure that the work to be performed here would be of the highest significance and value from the point of view of future developments and should be another aid to export trade.

Not the least important of the advantages which it was expected would flow from this research would be fuel economy. The total annual coal bill of the British Railways was in the neighbourhood of £36 million; and over 90 per cent. of the coal consumption represented by that expenditure was for locomotive purposes. For this reason any saving which could be made in the enormous quantities used by the railways would be very valuable indeed.

The opening of this testing station had also a wider significance as an indication that this country, though beset by economic difficulties, was continuing to play a leading part in industrial research. This was true of all sections of the transport industry, and it was no mere accident that the country which pioneered the steam railway and had made itself supreme in shipbuilding was also producing road vehicles second to none. In the field of road construction also, important research was being carried out, the results of which would be incorporated in the new roads and bridges which would be put in hand as soon as national resources permitted. Such efforts in research were directed to one end—that of giving this country the finest transport system in the world, while at the same time enhancing the reputation of British engineering abroad.

With the additional knowledge which this testing station would provide, he was sure that in the sphere of locomotive engineering Britain would continue to hold her foremost place.

Group at Rugby on October 19 including present and former Chief Mechanical Engineers of the main-line railways

Left to right: Messrs. A. H. Peppercorn, Chief Mechanical Engineer, Eastern and North-Eastern Regions; O. V. Bulleid, Chief Mechanical Engineer, Southern Region; M. L. Armand, a Deputy General Manager, French National Railways; Messrs. F. W. Hawksworth, Chief Mechanical Engineer, Western Region; E. Thompson, retired Chief Mechanical Engineer, L.N.E.R.; M. M. Parmantier, Chief of the Rolling Stock & Running Department, French National Railways; Sir William Stanier, retired Chief Mechanical Engineer, L.M.S.R.; Mr. H. G. Ivatt, Chief Mechanical Engineer, London Midland Region

Rugby Locomotive Testive Station

(*Concluded from page 494*)

chronous vibrations could, if not damped induce forces of dangerous magnitude, even exceeding plus and minus 100 tons.

The firing platform, which can be raised and lowered by hand, supports a coal bunker and shovelling plate forming part of a recording weighing machine, so that the amount of coal supplied and fired can be known at any time. The quantity of water supplied to the locomotive is measured both by means of water meters and by feeding from a calibrated tank, replenished in quantities of 500 gal. from two further calibrated tanks. Special arrangements are made to meter the amount of exhaust steam used by any exhaust injector or feed-water heater.

The locomotive is actually placed on the rollers by means of a special lifting table, which consists of two heavy beams running the length of the plant, being placed just inside the rollers and supported on jacks adjacent to each roller. This table can be raised and lowered a small amount, so that in the up position, the locomotive is carried on the flanges of its wheels, while the treads of the tyres are raised clear of the rollers.

It is of the utmost importance to keep the locomotive in place as accurately as possible, for any departure of the locomotive axles from the verticals through the centres of the rollers, induces a gravitational error in the recorded drawbar-pull. For this reason, the Amsler dynamometer is fitted with that firm's special mediating gear, by means of which any departure from the correct position of the drawbar causes oil to be pumped into or out of the hydraulic cylinders, automatically to correct the error. The gear, however, does more than this, for it not only records the error of position continuously, but also integrates the error in draw-bar pull over the whole of a test, so that the appropriate correction can be made to the recorded amount of work done.

The testing station includes a small workshop at the rear of the test house, where experimental fittings can be made, and minor repairs to plant or locomotives carried out.

The administration building includes a drawing office where any special fittings can be designed, and where all computation of results of tests, preparation of reports, and proposals for future tests, can be undertaken.

The detailed design and construction of the locomotive testing equipment were carried out to the requirements of the management committee by Heenan & Froude Limited, of Worcester, to whom Alfred J. Amsler & Company supplied the drawbar dynamometer and recording table. The Cambridge Instrument Co. Ltd. supplied the indicating and recording instruments, thermometers, gas analysis recorders, etc.

The following are the other principal contractors or sub-contractors concerned in the construction and equipment of the testing station:—

Head, Wrightson & Co. Ltd.	Steel frame of main building
B. Sunley & Co. Ltd.	Foundations and ground floor of main building
Edward Wood & Sons Ltd.	Superstructure of main building and administration building structure
Caffin & Company	Control room building, mess room, garage, paths and roadways, and all completion, painting and decorating
W. Freer & Co. Ltd.	Heating installations
Rashleigh, Phipps & Co. Ltd.	Electric wiring and lighting
Henry Lees & Co. Ltd.	Overhead crane and coal bunkers
Newalls Insulation Company	Sound insulation of control room
Cowans, Sheldon & Co. Ltd.	Wheel-Drop
Kitchen & Wade Limited	Universal machine tool
Dobbie, McInnes Limited	Farnboro electric indicator

The permanent way work was carried out departmentally by the Chief Civil Engineer's Department of the L.M.S.R. and London Midland Region.

In the initial stages of design of the final project, the advice was also obtained of M. Pierre Place, at that time Superintendent of the Vitry testing station, French National Railways.

Swedish State Railways

Opening of new London premises

The Royal Board of the Swedish State Railways last week invited a number of British railway officers, travel agents, editors and others to view the new premises of the Swedish State Travel Bureau recently opened at 21-22, Coventry Street, London. They were subsequently conveyed in motor-coaches to Millwall Docks and entertained to dinner on board the Swedish Lloyd Steamship Company's m.v. *Saga*. Mr. G. Dahlbeck, Director-General of the Swedish State Railways, received the guests, who included:—

Messrs. Miles Beevor, B. Bergaust, C. K. Bird, B. W. Boddy, J. G. Bridges, A. Buraas, K. R. Bökman, T. Emers, V. D. Fay, G. W. E. Fortune, W. Frame, E. Fröshaug, H. H. Gardiner, R. H. Hacker, Lord Hacking, Messrs. B. Hallström, V. Hammarling, A. Hamrin, C. Holm, O. Jensen, J. A. Kay, Asta Kihlbom, C. E. Kihlstedt, S. A. Krook, G. Lacoste, N. H. Leander, J. S. Lilliehöök, O. Lindquist, O. Lundborg, B. W. Malm, A. Martin, J. Maxwell, A. Meakin, L. H. K. Neil, A. E. Pehrson, R. Riches, W. N. Roberts, Lord Sempill, Sir Geoffrey Shakespeare, Messrs. C. E. R. Sherrington, R. E. Sinfield, Sir Eric Studd, Messrs. G. Sutton, E. Swenne, E. Svenrik, Hedvig Thorburn-MacFarlaine, R. Vance, V. Wallborg, J. E. Whitehall and T. G. Wickbom.

Mr. G. Dahlbeck, Lord Hacking and Lord Sempill all spoke of how a greater interchange of travel would help in maintaining world peace.

On page 506 we give pictures of the Swedish Travel Bureau both before and after the alterations. Practically all the material for the reconstruction was brought from Sweden, but both the architect and the contractors were British.

The counter in the booking hall is crescent shaped, length 37 ft. 6 in, and to it are attached four folding seats for the use of clients. There are also six armchairs, two at each window, and a settee fixed to the wall. Shelves have been placed above each window; each shelf has space for nine plants for floral decoration the whole year round.

As in the case of the public, the staff have also ample space at their disposal, both in the booking hall and in the basement. Thus the manager has his own room communicating with the booking hall, and in the basement of 22, Coventry Street there is plenty of space for the office staff. On occasion this can be used for exhibitions and film shows. The office premises have been generally improved and are painted in light colours, and fluorescent lighting has been installed.

French Railwaymen's Visit to London

When M. Maurice Lemaire, General Manager of the French National Railways, visited Great Britain last month he stated that interchange visits between French and British railwaymen could only result in a better understanding of each others' problems.

A long week-end visit was recently made by a party of French railwaymen from the locomotive depots of La Chapelle (Paris), Calais and Ivry-sur-Seine as the guests of the staff at Nine Elms Motive Power Depot, Southern Region, British Railways.

On arrival at Victoria Station they were met by Mr. J. P. Maitland (Running Shed Superintendent, Nine Elms), representatives of the staff of the depot, and Mr. G. V. Metcalfe (Acting Assistant Welfare Officer); and later the same morning the party visited Westminster Abbey, returning to Waterloo for luncheon, where it was received by Mr. R. M. T. Richards, Deputy Chief Regional Officer, and other officials of the Region. In welcoming the visitors, Mr. Richards expressed his great satisfaction that it had been found possible, despite many difficulties, to arrange a return visit of French railwaymen to England. After luncheon a visit was paid to St. Paul's Cathedral, and thence to Raynes Park Sports Ground.

Before the members of the party returned to France they visited the Orphanage and Old Folks' Home at Woking; Waterloo Station signal box; Nine Elms Locomotive Depot; and Hampton Court Palace.

M. Bourgogne (Running Shed Superintendent, La Chapelle, Paris), on behalf of the party, expressed appreciation of the manner in which they had been received everywhere. He offered profound thanks to all who had made their stay one complete round of instruction combined with enjoyment.

SCAMMELL LORRIES LIMITED.—There was a very large turnout for the annual staff ball of Scammell Lorries Limited which took place at Watford on Friday last. This event, the eleventh of its kind, was held in the Town Hall, and was attended by more than 400 guests, consisting of members of the staff and their families, who danced until the early hours of Saturday morning.

GLOUCESTER RAILWAY CARRIAGE & WAGON COMPANY.—A 30 per cent. increase in output, without any corresponding increase in overhead charges, resulted in the group trading profits of the Gloucester Railway Carriage & Wagon Co. Ltd. for the year ended May 31 last advancing by £42,622 to £166,916. The combined net profits were £79,922, against £70,205, after charging £56,890, against £5,627, for tax. The net profit of the parent company was £71,112, against £68,748, of which £25,000, the same amount as last year, has been transferred to general reserve and £43,313 provided for the proposed dividend of 15 per cent., which also is the same as last year. An amount of £19,123 is carried forward. The taking over by the Transport Commission of the wagons owned by the Gloucester Wagon Hiring Company resulted in a substantial capital profit which is reflected in the consolidated balance sheet by an increase in the general reserve from £9,424 to £532,000. This latter figure includes £522,126 profits realised on sales of investments including the estimated surplus on liquidation of the subsidiary company.

British Transport Commission Statistics

Summary of the principal statistics for the four-week period ended August 8

The eighth of the series of *Transport Statistics**, published by the British Transport Commission, has quickly followed on No. 7, which was summarised in our issue of October 8. Usually the period to August 8 is a good one for passenger travel and a lean time for freight traffic, due to the effects of the holiday season. This year, Table 1 shows that the increase in passenger receipts was only £1,154,000 over 1947, or 8 per cent. As recorded in Table 2 (A), there was a decline of nearly 10 per cent. in passenger journeys originating during the month of July. A fall of nearly 13 per cent. in the Western Region and of over 29 per cent. in the North Eastern Region must raise questions about the services provided in these areas and the existing level of fares.

Freight receipts were £2,231,000 less than in the July period, but £1,307,000 more than in August, 1947. The total receipts from railway working were £2,784,000 above 1947, or 11 per cent., making the aggregate increase for 32 weeks this year up to £30,599,000, or 17·5 per cent.—much below the level required to meet growing expenditure. Table 2 (B) reveals a serious decrease of 9·52 per cent. in merchandise traffic originating; the loss was most marked in the Eastern Region at nearly 19·5 per cent. and in the Western at 13·5 per cent. An increase of 150,000 tons of coal in the first of these Regions was poor compensation for a decrease of 100,000 tons of high class goods. The originating tonnage of all classes for all Regions was up by nearly 3 per cent., but ton mileage was down, because of a shorter length of haul for minerals and coal.

More coaching train miles were run in all regions; curiously, the highest rate of increase was in the North Eastern. Fewer freight train miles were worked everywhere, save in the Eastern and North Eastern Regions for the carriage of minerals and coal. Freight train speed improved slightly, except in the Southern and Scottish Regions, but 8·82 m.p.h. is a poor figure for a summer period. For the first time this year, locomotive coal consumption fell below 60 lb. per engine mile.

* British Transport Commission Statistics, 1948. Series No. 8. Period to August 8. London: British Transport Commission. Price 1s.

STAFF

—	Commission's head office	British Railways	London Transport	Hotels and Catering	Steamships Marine and Docks	Inland Waterways	Railway Clearing House	Total
Administrative ...	129	80,418	4,801	1,812	1,719	701	621	90,201
Operating ...	—	354,655	61,069	—	13,636	2,318	—	431,678
Maintenance & construction ...	—	213,602	31,061	—	5,595	2,416	—	252,674
Others	12	14,006	3,945	14,716	—	—	353	33,032
Total ...	141	662,681	100,876	16,528	20,950	5,435	974	807,585

1. BRITISH TRANSPORT COMMISSION TRAFFIC RECEIPTS

—	Four weeks to August 8		Inc. or dec.	Aggregate to August 8		Inc. or dec.
	1948	1947		1948	1947	
	£000	£000	£000	£000	£000	£000
British Railways—						
Passengers	14,502	13,348	+ 1,154	77,388	70,944	+ 6,444
Parcels, etc., by passenger train ...	2,375	2,052	+ 323	17,849	15,615	+ 2,234
Merchandise	5,257	5,112	+ 145	51,386	42,540	+ 8,846
Minerals	1,890	1,505	+ 385	17,409	12,201	+ 5,208
Coal & coke	4,190	3,418	+ 772	40,230	32,368	+ 7,862
Livestock	62	57	+ 5	509	504	+ 5
	28,276	25,492	+ 2,784	204,771	174,172	+30,599
Steamships	1,295	1,161	+ 134	5,592	5,014	+ 578
Inland Waterways	121	128	— 7	1,005	883	+ 122
Hotels & Catering	1,130	1,047	+ 83	8,081	7,468	+ 613
London Transport—						
Railways	1,189	1,078	+ 111	8,962	8,072	+ 890
Buses & coaches	2,510	2,396	+ 114	19,327	17,294	+ 2,033
Trams & trolleybuses	856	840	+ 16	6,881	6,297	+ 584
	4,555	4,314	+ 241	35,170	31,663	+ 3,507
Total	35,377	32,142	+ 3,235	254,619	219,200	+35,419

2. BRITISH RAILWAYS

(A) Passenger Journeys Originating

—	Region						Total
	London Midland	Western	Southern	Eastern	North Eastern	Scottish	
	+ or — over 1947 Per cent.	+ or — over 1947 Per cent.	+ or — over 1947 Per cent.	+ or — over 1947 Per cent.	+ or — over 1947 Per cent.	+ or — over 1947 Per cent.	+ or — over 1947 Per cent.
Ordinary fares	1,656,000 (—16·03)	847,000 (—6·26)	2,400,000 (—11·70)	916,000 (—10·34)	240,000 (—41·30)	551,000 (—14·61)	6,610,000 (—13·82)
Monthly return	8,726,000 (—19·64)	2,750,000 (—30·56)	8,589,000 (—17·81)	2,926,000 (—20·61)	957,000 (—61·02)	2,140,000 (—18·71)	26,088,000 (—23·36)
Excursion, week-end, cheap day, etc.	3,558,000 (+173·58)	1,837,000 (+151·53)	2,640,000 (+154·08)	1,108,000 (+215·82)	1,361,000 (+62·55)	701,000 (+187·60)	11,205,000 (+148·90)
Workmen	6,848,000 (—7·62)	1,696,000 (—11·26)	6,196,000 (+1·88)	1,854,000 (—9·94)	815,000 (—31·70)	778,000 (—4·34)	18,187,000 (—6·60)
Other descriptions ...	1,659,000 (—10·95)	1,059,000 (—15·40)	1,808,000 (—9·57)	808,000 (—8·40)	470,000 (—19·47)	524,000 (—16·98)	6,328,000 (—12·25)
Season tickets	4,823,000 (—25·82)	1,602,000 (—35·32)	9,197,000 (—14·05)	1,881,000 (—23·27)	547,000 (—24·00)	1,233,000 (—21·55)	19,283,000 (—21·04)
Total	27,270,000 (—8·82)	9,791,000 (—12·84)	30,830,000 (—6·54)	9,493,000 (—9·17)	4,390,000 (—29·18)	5,927,000 (—9·34)	87,701,000 (—9·88)

(B) Freight Tonnage Originating

—	Region						Total
	London Midland	Western	Southern	Eastern	North Eastern	Scottish	
	+ or — over 1947 Tons Per cent.	+ or — over 1947 Tons Per cent.	+ or — over 1947 Tons Per cent.	+ or — over 1947 Tons Per cent.	+ or — over 1947 Tons Per cent.	+ or — over 1947 Tons Per cent.	+ or — over 1947 Tons Per cent.
Merchandise...	1,129,000 (—5·72)	636,000 (—13·45)	279,000 (+6·11)	412,000 (—19·46)	449,000 (—11·05)	478,000 (—9·34)	3,383,000 (—9·52)
Minerals	1,452,000 (+2·56)	564,000 (+10·21)	102,000 (—7·12)	615,000 (+8·02)	762,000 (+8·34)	508,000 (+12·47)	4,003,000 (+6·52)
Coal & Coke	3,628,000 (+5·30)	1,505,000 (+8·40)	221,000 (+0·10)	1,601,000 (+10·34)	1,981,000 (+5·14)	1,210,000 (+6·53)	10,146,000 (+6·52)
Livestock	14,000 (+7·46)	11,000 (+12·69)	3,000 (—5·22)	5,000 (—30·16	4,000 (+8·11)	17,000 (—8·97)	54,000 (—2·37)
Total	6,223,000 (+2·50)	2,716,000 (+2·70)	605,000 (+1·40)	2,633,000 (+3·72)	3,196,000 (+3·23)	2,213,000 (+3·73)	17,586,000 (+2·96)

(C) Net Ton Miles

—	Region						Total
	London Midland	Western	Southern	Eastern	North Eastern	Scottish	
	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.
Merchandise & livestock ...	152,783,000 (−5·01)	86,512,000 (−7·76)	24,964,000 (+7·60)	62,709,000 (−8·81)	39,302,000 (−8·65)	65,944,000 (−7·51)	432,214,000 (−6·23)
Minerals	114,526,000 (+3·59)	60,945,000 (+12·91)	13,227,000 (−12·85)	77,181,000 (+4·72)	31,414,000 (+18·26)	31,828,000 (−1·95)	329,121,000 (+5·34)
Coal & coke	235,094 (—)	102,796,000 (−5·58)	22,707,000 (−6·64)	140,360,000 (+6·09)	59,679,000 (+5·10)	50,716,000 (−2·14)	611,352,000 (+0·35)
Total, all classes of traffic...	502,403,000 (−0·81)	250,253,000 (−2·49)	60,898,000 (−2·88)	280,250,000 (+1·99)	130,395,000 (+3·18)	148,488,000 (−4·56)	1,372,687,000 (−0·72)

(D) Train Miles

—	Region						Total
	London Midland	Western	Southern	Eastern	North Eastern	Scottish	
	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.	+ or − over 1947 Per cent.
Coaching train miles—							
Loaded	4,996,000 (+10·84)	2,962,000 (+6·43)	4,328,000 (+5·25)	2,733,000 (+7·17)	1,192,000 (+8·25)	1,958,000 (+6·77)	18,169,000 (+6·29)
Empty	222,000 (+8·16)	155,000 (+7·94)	149,000 (−5·34)	116,000 (+22·10)	66,000 (+24·52)	93,000 (−0·25)	801,000 (+8·73)
Total loaded & empty ...	5,218,000 (+10·71)	3,117,000 (+6·51)	4,477,000 (+5·26)	2,849,000 (+7·52)	1,258,000 (−10·76)	2,051,000 (+6·43)	18,970,000 (+6·38)
Freight train miles—							
Loaded	2,696,000 (−0·55)	1,440,000 (−0·14)	498,000 (+3·85)	1,502,000 (+1·58)	824,000 (+0·21)	1,228,000 (−5·04)	8,188,000 (−0·93)
Empty	464,000 (+0·82)	171,000 (+1·14)	11,000 (−23·76)	272,000 (−2·56)	185,000 (+9·99)	182,000 (+8·28)	1,285,000 (−2·07)
Total loaded & empty ...	3,160,000 (−0·35)	1,611,000 (—)	509,000 (−4·36)	1,774,000 (+0·92)	1,009,000 (+1·88)	1,410,000 (−3·51)	9,473,000 (−0·53)
Total coaching & freight train miles—							
Loaded	7,692,000 (+5·14)	4,402,000 (+3·14)	4,826,000 (−0·70)	4,235,000 (+5·13)	2,016,000 (+4·23)	3,186,000 (+0·86)	26,357,000 (+2·68)
Empty	686,000 (+4·49)	326,000 (+4·54)	160,000 (−14·55)	388,000 (+3·74)	251,000 (−19·79)	275,000 (+4·01)	2,086,000 (+3·33)
Total loaded & empty ...	8,378,000 (+5·02)	4,728,000 (+4·20)	4,986,000 (+3·91)	4,623,000 (+5·00)	2,267,000 (+8·31)	3,461,000 (+2·14)	28,443,000 (+5·02)

(E) Freight Train Miles per Train Hour

Region												Total	
London Midland		Western		Southern		Eastern		North Eastern		Scottish			
1948	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948	1947
7·72	7·36	9·68	9·01	8·78	8·86	8·45	8·08	10·57	10·10	10·42	10·46	8·82	8·47

(F) Locomotive Coal Consumption

—	Region												Total	
	London Midland		Western		Southern		Eastern		North Eastern		Scottish			
	Tons	+ or − over 1947 Per cent.	Tons	+ or − over 1947 Per cent.	Tons	+ or − over 1947 Per cent.	Tons	+ or − over 1947 Per cent.	Tons	+ or − over 1947 Per cent.	Tons	+ or − over 1947 Per cent.	Tons	+ or − over 1947 Per cent.
Tonnage consumed ...	328,000	(+3·14)	160,000	(+11·52)	74,000	(+3·13)	188,000	(+3·55)	84,000	(+2·33)	160,000	(+1·31)	994,000	(+4·10)
Lb. per engine mile ...	61·90	(−0·08)	51·03	(+7·36)	52·89	(+4·20)	62·15	(−0·64)	59·42	(−1·88)	68·80	(+0·82)	59·88	(+1·22)

(G) Rolling Stock Position

	Operating stock	Number under repair	Serviceable stock	Serviceable stock in 1947
Locomotives ...	19,934	3,776	16,158	16,032
Coaching vehicles	55,239	6,265	48,974	47,723
Freight wagons ...	1,187,866	152,588	1,035,278	1,223,396

3. INLAND WATERWAYS

Tonnage of traffic and ton-miles

	Tonnage	+ or − over 1947 per cent.	Ton-miles	+ or − over 1947 per cent
General merchandise	289,000	−10·83	5,905	−5·96
Liquids in bulk ...	125,000	+0·79	2,925	+11·08
Coal, coke, patent fuel and peat ...	357,000	+3·68	5,155	−3·68
Total (all classes of traffic)	771,000	−2·71	13,985	−1·96

4. LONDON TRANSPORT

(A) Passenger Journeys Originating

	Number	+ or − over 1947 per cent.
Railways	47,254,000	(+6·51)
Buses & coaches ...	212,890,000	(+7·76)
Trams & trolleybuses ...	91,204,000	(+2·37)
Total	351,348,000	(+6·14)

(B) Rail and Road Car Miles

	Miles	+ or − over 1947 per cent.
Railways	17,614,000	(+9·29)
Bus & coaches ...	24,376,000	(+6·22)
Trams & trolleybuses ...	8,743,000	(+3·28)
Total	50,733,000	(+6·74)

(C) Rolling Stock Position

	Operating stock	Number under repair	Serviceable stock	Serviceable stock in 1947
Railway vehicles ...	3,948	401	3,481	3,361
Buses & coaches ...	7,441	970	6,471	5,790
Trams & trolleybuses	2,624	284	2,340	2,270

DIESEL ENGINE USERS ASSOCIATION.—A paper entitled: "Gas Turbines—An Introduction for the Prospective User," will be read by Mr. R. J. Welsh before the Diesel Engine Users Association on November 18. The meeting will be held at Caxton Hall, Westminster, London, S.W.1, at 2.30 p.m.

Notes and News

London Transport Players.—The London Transport Musical & Dramatic Society is presenting "The Desert Song" at the Scala Theatre on Thursday, November 4, at 7 p.m.

Visit to Dunlop Rubber Company.—A visit to the Dunlop Rubber Co. Ltd. will be made by the Institute of Traffic Administration, Birmingham Centre, on November 17, at 1.45 p.m.

Traffic Inspector Required.—A traffic inspector, between 23 and 35 years of age, is required by the Government of Nigeria for the railway department, for one tour of 18 to 24 months, with possible permanency. See Official Notices on page 507.

Draughtsman (Civil Engineering) Required.—A draughtsman (civil engineering) is required by the Nigerian Government Railway for one tour of 18 to 24 months in the first instance. Candidates must have had at least five years' experience in the drawing office of a civil engineering railway department. See Official Notices on page 507.

Maybach Works not to be Dismantled.—According to information from the French occupation authorities in Germany, the Maybach-Motorenwerke, of Friedrichshafen, have been taken from the list of industrial works earmarked for dismantling. The Maybach works were, before 1939, the chief German manufacturers of high-speed engines for railcars. Should the decision be reversed later, the German management of the works has decided to continue with the preparation of a scheme for the establishment of a new works where the manufacture of the Maybach engines could be resumed.

Scottish Region Station Closing.—As from Monday, November 1, passenger train services to and from Livingston Station will be withdrawn and the station closed except for goods traffic in full wagon loads, which will continue to be dealt with. Parcels and all sundry goods traffic for Livingston will be handled at Bathgate Upper Station, on and from the above date.

Southern Region Lecture & Debating Society.—At a meeting of British Railways, Southern Region, Lecture & Debating Society, to be held at the Chapter House, St. Thomas Street, London Bridge, at 5.45 p.m. on November 18, Mr. Miles Beevor, Chief Secretary & Legal Adviser, British Transport Commission, will read a paper on: "The Work of the British Transport Commission."

Tourist Trade Advertising Campaign.—An intensive "Come to Britain" advertising campaign aimed at the 1949 tourist trade is planned by the British Travel Association (Tourist Division of the British Tourist & Holiday Board). From October, 1948, to the end of March, next year, whole-page and half-page advertisements are scheduled to appear in America's leading magazines, newspapers, and trade and technical publications. In addition there will be campaigns on a smaller scale in Canada, South America, Australasia, Belgium, and Sweden. A similar advertising campaign in the United States for the 1948 tourist season was a proved success and results were reflected in this year's record tourist figures, though for the 1949 season, with most European countries, together with travel interests in the Americas, spending big sums on advertising, competition in the American travel market will be keen.

Canadian National Railways Results.—An increase of $2,306,000 in net revenue, all inclusive, for September, and a decrease of $20,456,000 in net revenue for the nine months of 1948, as compared with the corresponding periods of 1947, is announced. September expenses include a credit adjustment in respect of back-time payroll estimates.

Institute of Transport.—Sir Cyril Hurcomb, Chairman of the British Transport Commission, will read a paper, "Progress Towards the Integration of Transport," before the Institute of Transport, on November 15, at 5.30 p.m. The meeting is being held in the Jarvis Hall, Royal Institute of British Architects, 66, Portland Place, London, W.1. Sir Cyril Hurcomb is a Past-President of the Institute of Transport.

Rhodesian Railways and the Marshall Plan.—It has been suggested that the major development of Southern Rhodesia's railway access to the sea is one of the projects which Britain may desire to finance from any Marshall Plan dollars she can obtain for African developments. In submitting projects for consideration by officials of the Economic Co-operation Administration, Southern Rhodesia has laid great stress on the necessity for better access to the sea. This does not mean necessarily the building of a rail link with South West Africa, but more likely a development such as double tracking of the existing line to Beira.

Swedish Travel Bureau London Offices

(*See article on page* 503)

Exterior of the old offices

The old enquiry hall

Frontage of the new building

The new enquiry hall

OFFICIAL NOTICES

None of the vacancies on this page relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he, or she, is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

IMMEDIATE delivery unused Sentinel B.E. type Industrial Steam Locomotive, 100 h.p., standard gauge.—Write Box 664, DORLAND ADVERTISING, 18/20, Regent Street, S.W.1.

A DIESEL Electric Rail Traction Sales Engineer is required by a large Midland Engineering concern. Salary up to £700 per annum, according to qualifications and experience. Reply age, etc., to Box 474, T. & G., 101, St. Martin's Lane, London, W.C.2.

4-8-2 CLASS "15F" LOCOMOTIVE FOR THE SOUTH AFRICAN RAILWAYS. The latest examples of these main-line passenger and freight locomotives have been built by the North British Locomotive Co. Ltd. Reprinted from *The Railway Gazette* of September 20, 1946. *Price* 2s. *By post* 2s. 2d.

Crown Agents for the Colonies

APPLICATIONS from qualified candidates are invited for the following post:—

DRAUGHTSMAN (CIVIL ENGINEERING) required by Nigerian Government Railway. Capital works, for one tour of 18 to 24 months in the first instance. Fixed basic salary according to age and experience between £600 and £970 a year, including expatriation pay. Outfit allowance £60. Free passages. Candidates must have had at least five years' experience in drawing office of a Civil Engineering Railway Department (or Consulting Engineers or Contractors with practice in railway work) Knowledge of design and construction details of civil engineering structures and railway track work is required, including ability to take off quantities, prepare estimates and draft general specifications. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M/N/17417 (3D) on both letter and envelope.

RAILWAY MAINTENANCE PROBLEMS. By H. A. Hull (late District Engineer, L.M.S.R.). Valuable information. With much sound advice upon the upkeep of permanent way. Cloth, 8½ in. by 5½ in. 82 pp. Diagrams. 5s. *By post* 5s. 3d.

Crown Agents for the Colonies

APPLICATIONS from qualified candidates are invited for the following post:—

TRAFFIC INSPECTOR required by the Government of Nigeria for the Railway Department for one tour of 18 to 24 months, with possible permanency. Salary and expatriation allowance £600, rising to £800 a year. Outht allowance £60. Free passages. Candidates, age 23 to 35, must have had experience in a home railway of goods and passenger station work and accounts, telegraph offices and marshalling yards, and must be qualified in train working under the absolute block system and in railway signalling. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M/N/17525 (3E) on both letter and envelope.

RAILWAY SIGNALLING AND COMMUNICATIONS INSTALLATION AND MAINTENANCE. A practical guide, especially intended to help Signal Inspectors, Installers, Fitters, Linesmen, Draughtsmen, and all concerned with installing and maintaining Signal, Telegraph, and Telephone Equipment. 416 pp. Many illustrations. Cloth, 8s. *By post* 8s. 6d.

Magdeburg—Marienborn Line Reopened.—Agency reports announce that the 40-mile section of line between Magdeburg and Marienborn, the Russian control point on the British Zone border, beyond Helmstedt, has been reopened. German passengers travelling between Magdeburg and Marienborn no longer require to have the special Russian permits previously demanded for passengers moving to border points.

More Roofing at Waterloo Station.—A new roof, 135 ft. long, is being erected at Waterloo Station, Southern Region, to cover the entire roadway and pavement leading from the station towards York Road, so that ocean liner passengers arriving at the station from Southampton will be under cover from the time they leave the trains until they join their taxis or cars. In the busy summer months, this additional roofing also will serve as protection to those passengers queueing for trains at week-ends.

Increase in French Railway Fares.—French railway passenger fares have been increased from October 4. Below are given the previous and the new rates per kilometre:—

	Old rate Francs	New rate Francs
1st class	4.95	6.40
2nd class	3.21	4.20
3rd class	2.25	3.00

A new list of fares is in course of preparation. In the meantime, quotations for particular fares will be given on application to French Railways Limited, 179, Piccadilly, London, W.1.

Ulster Transport Authority. — The £485,989 9s. 5d. compensation to be paid to the stockholders of the Belfast & County Down Railway is to be distributed as set out in the 1948 Transport Act, which provides for the vesting of the undertaking in the Ulster Transport Authority. At meetings of the seven groups of stockholders in Belfast, six decided not to appoint representatives to consider any other form of distribution, and one—that of the 5 per cent. preference stockholders—agreed on a representative as a safeguard. Mr. T. B. Andison, Secretary, stated that the Ministry had confirmed that unless each of the seven groups appointed a representative there could be no meeting of the representatives to discuss a division of the compensation. The compensation per £100 nominal value, set out in the Act, is as follows:—Ordinary stock, £6 1s. 3d.; 4 per cent. preference stock, £6 15s.; 4½ per cent. "A" preference stock, £53 16s. 3d.; 5 per cent. preference, £31 1s. 3d.; 3 per cent. baronial guaranteed shares, £100; 4 per cent. debenture stock, £87 13s. 9d.; 3 per cent. debenture stock, £93 7s. 6d. In the Northern Ireland House of Commons, the Parliamentary Secretary to the Ministry of Commerce told Mr. Diamond (Soc. Rep., Falls) recently that no arrangement had been submitted so far by the Ulster Transport Authority for the acquisition of the Great Northern Railway.

Institute of Traffic Administration.—Major-General G. N. Russell, Chairman of the Road Transport Executive, will be the chief guest at the dinner meeting of the Institute of Traffic Administration's London Centre, arranged in association with the Women's Traffic Club, at 16, Queen Anne's Gate, S.W.1, on Wednesday, November 3, at 6.30 p.m.

South African Royal Train.—On October 22 the directors of the Metropolitan-Cammell Carriage & Wagon Co. Ltd. showed two films of the South African Royal Train at the Savoy Hotel, London, W.C.2. Mr. A. Boyd, Managing Director, received a large number of guests, including Sir Cyril Hurcomb, Chairman of the British Transport Commission, Members of the Railway Executive, and a number of railway officers, as well as representatives of manufacturing companies associated with the railway industry and of overseas railways. The first film showed the coaches for the Royal Train being made and assembled at the Metropolitan-Cammell Works at Saltley, Birmingham, and the inspection of them by the Royal Family before their despatch for South Africa. The second film, which was in colour, showed the arrival of the coaches in South Africa and scenes taken during the tour.

New Underground Telephone System.—London Transport has installed throughout the Underground a special telephone system, designed to speed-up the supply of vital information, which consists of a steel wire recording device linked with each of the Underground 1,300 private telephones. Special messages giving details of delays and other special circumstances are recorded on the steep tape by officials on the Underground's "brain centre" at Leicester Square. Every stationmaster, booking clerk, or porter on the Underground can obtain a play-back of the messages by dialling a code number on the railway telephones. The system will enable all railway staff to obtain speedy details of any special occurrence, so that they can make the most effective local traffic arrangements.

Central Line Extension.—The £2,000,000 Central Line extension to be opened to the public by Mr. Alfred Barnes, Minister of Transport, on November 21, is the biggest on the Underground for 31 years, and will be in two sections. In the west there will be a 4¼-mile line from Greenford to Northolt, South Ruislip, Ruislip Gardens, and West Ruislip, alongside the Western Region Birmingham main line; in the east, 5¾ miles of line from Woodford to Buckhurst Hill and Loughton, with a branch from Woodford to Roding Valley, Chigwell, Grange Hill, and Hainault, over the former steam-operated lines of British Railways, Eastern Region.

Boys Killed While Trespassing on Line.—Two boys, aged thirteen and nine, were killed and two injured on October 23, when they were struck by a Bradford to London express while playing on the London Midland Region line near Hendon, close to the R.A.F. Station. Two other boys were injured and eight others had narrow escapes. The boys were placing pennies on the track and, in stepping back clear of a down goods train, were caught by the up express. It is stated that the place where the accident took place is a "black-spot" for trespassing by children.

Locomotive Film Show in Glasgow.—The Institution of Locomotive Engineers and the branch chairmen and secretaries of the railway mutual improvement organisation combined for a film show of common interest, in Glasgow, on October 14. The programme contained three items of particular note: "Locomotive Testing Plant at Vitry—France"; "Controlled Firing of Locomotives"; "Main-Line Diesel." The mutual improvement organisation is a voluntary scheme arranged by the footplate staff for the study of the construction and working of locomotives and all aspects of train working; in Scotland the organisation has a membership of almost 5,000, in 44

branches. This meeting was arranged by Mr. R. F. Harvey, Scottish Region Motive Power Superintendent, who presided, and among the guests were Sir Patrick Dollan, Chairman of the Scottish Fuel Efficiency Committee, Lt.-Colonel Harold Rudgard, Chief Officer (Motive Power), Railway Executive, and President of the Institution of Locomotive Engineers, and Mr. T. F. Cameron, Chief Regional Officer, Scottish Region.

Transport Securities.—The Stock Exchange Share & Loan Department has been advised that all the accounts of British Transport stock on the registers kept by the undermentioned bodies, representing stock arising from the conversion of the former securities, have been passed to the Bank of England:—

Birmingham Canal Navigation
Coventry Canal Navigation
Lee Conservancy Board
Leeds & Liverpool Canal
Oxford Canal
Sheffield & South Yorkshire Navigation
Shropshire & Montgomeryshire Light Railway
Whitechapel & Bow Railway

All correspondence in respect of the above accounts should therefore be addressed to the Bank of England, Regent Arcade House, Argyll Street, W.1.

Forthcoming Meetings

October 29 (*Fri.*).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, at 6 p.m. Joint meeting with the Institution of Electrical Engineers. "High-Pressure Steam Power Plant," by Mr. W. N. C. Clinch.

October 29 (*Fri.*).—Institution of Railway Signal Engineers, annual dinner and dance at Hamilton Hall, Abercorn Rooms, Great Eastern Hotel, Liverpool Street Station, at 6 p.m.

October 30 (*Sat.*).—Railway Students' Association, London School of Economics & Political Science. Visit to Southampton Docks, leaving Waterloo 8.30 a.m.

November 1 (*Mon.*).—Institute of Transport, Metropolitan Section, at Livingstone House, Broadway, S.W.1, at 6 p.m. "Railways and the Transport Act, 1947," by Mr. D. Blee.

November 1 (*Mon.*).—Society of Engineers, in the apartments of the Geological Society, Burlington House, London, W., at 5 for 5.30 p.m. "Soil Mechanics and the Practical Engineer," by Mr. C. B. Brown.

November 2 (*Tues.*).—Institute of Transport, anniversary luncheon at the Connaught Rooms, Great Queen Street, W.C.2, at 12.45 for 1.15 p.m. Address by Sir Eustace Missenden, Chairman, Railway Executive.

November 3 (*Weds.*).—Institute of Traffic Administration, Birmingham Centre, at the Chamber of Commerce, at 7 p.m. "Large Scale Administration," Some Lessons from T.V.A., by Mr. J. A. Dunnage.

November 4 (*Thurs.*).—Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2, at 5.30 p.m. "Some Projects favourable to Direct-Current Transmission, and the Role of the British Electrical Industry in Relation thereto," by Mr. F. J. Erroll and Lord Forrester.

November 4 (*Thurs.*).—British Railways, Western Region, London Lecture & Debating Society, in the Clerks' Dining Club, Bishop's Bridge Road, Paddington, at 5.45 p.m. "Freight Marshalling Yard Operations," by Mr. A. I. Clifford.

Railway Stock Market

Success achieved by the £100,000,000 issue of new 3 per cent. Electricity stock (1974-77) at £99½ failed to put fresh strength into the gilt-edged market. Nevertheless the new stock established a premium of up to 7s. 6d. in first dealings on Monday in active business. Disposition in many quarters is to await the Bill for steel nationalisation. Transport 3 per cent. stock (1978-88) after rallying to par eased to 99⅞, and sentiment was influenced by market gossip that the whole compensation for Tillings and other road transport concerns may be in Transport stock. There are also suggestions that there may be a considerable issue of Transport stock to provide for re-equipment of the railways. With Transport stock (1978-88) now carrying approximately 18s. of accrued interest, the current price of 99⅞ seems not unattractive in relation to that for the new Electricity stock, even allowing for the fact that Transport stock is longer-dated.

Chief feature of foreign rails has been a sharp reaction to 169½ in San Paulo ordinary stock on the statement that the question of a dividend must be left until results are known. When the adjourned meeting is held it is hoped to bring forward a plan for paying off the preference stock and making a distribution on the ordinary. The market has deduced that less than par (£100) can be repaid to ordinary stockholders on the basis of the money received in respect of the "recognised" capital. Settlement of the claim for "unrecognised" capital may prove a very lengthy business, but, even so, granted a fair settlement the market is still assuming that the ordinary stock should be worth £200 eventually. Meanwhile the preference has strengthened to 97½ on its proposed dividend and on hopes that this stock will be repaid before long.

Leopoldina Railway stocks failed to hold earlier gains, the ordinary easing to 11½, and the preference to 38¼, while the 4 per cent. debentures were 69 and Leopoldina Terminal 5 per cent. debentures 65. Great Western of Brazil £10 shares were less active but steadier at 104s. 4½d. In other directions, United of Havana 1906 debentures strengthened to 16½, and Antofagasta ordinary and preference were 10 and 58½ respectively. Manila Railway issues have been less active with the "A" debentures 91 and 5 per cent. preference shares around 10s. Uruguay rails were generally little changed. Central Uruguay ordinary was 11½ and the second debentures 82.

Road Transport shares were firm generally, but Scottish Motor Traction fluctuated, coming back to 115s. 6d., after touching the new high level of 117s. 9d. Tillings were around 118s. 9d., and B.E.T. deferred stock steadier around £2,030. Iron and steels again attracted a fair amount of speculative buying in front of the Steel Bill. This reflected continued market hopes that the compensation basis may be assets values and not share values. John Brown were particularly good at 34s. 6d., but this was due partly to the reported big project in Rhodesia, the rise in Firth Brown shares, and the preference issue by A. C. Wickman. Guest Keen strengthened to 49s., and Dorman Long were 34s. 3d., but despite the big profit increase for the past year, T. W. Ward eased to 64s. 6d. Imperial Chemical changed hands up to 48s., and the new shares became fully-paid on Thursday. Gloucester Railway Carriage & Wagon shares have changed hands over 64s. Business up to £7⅞ took place in Charles Roberts and in Wagon Repairs 5s. shares at 21s. 9d. Vulcan Foundry became more active up to 28s. 4½d., Beyer Peacock were 24s. 9d., and North British Locomotive 24s. 6d. G. D. Peters 5s. shares strengthened to 16s. 3d.

Traffic Table of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: inc. or dec. compared with 1946/47	No. of week	Aggregate traffics to date: Total 1947/8	Aggregate traffics to date: Increase or decrease
				£	£		£	£
South & Central America	Antofagasta... ...	811	17.10.48	54,010	– 1,092	41	2,259,650	+ 473,896
	Bolivar	174	July, 1948	$28,960	– $69,357	30	$471,287	– $301,893
	Brazil	—	—	—	—	—	—	—
	Cent. Uruguay ...	970	9.10.48	27,449	– 781	14	463,936	– 13,960
	Costa Rica	281	July, 1948	35,904	+ 5,239	9	77,536	+ 14,013
	Dorada	70	Sept., 1948	30,656	+ 456	39	240,485	– 33,615
	G.W. of Brazil ...	1,040	16.10.48	37,900	– 3,100	41	1,325,400	– 16,400
	Inter. Ctl. Amer. ...	794	Aug., 1948	$996,899	– $52,158	35	$9,169,618	+ $157,550
	La Guaira	22¾	Sept., 1948	$101,522	– $4,339	39	938,856	– 49,239
	Leopoldina	1,920	16.10.48	53,265	– 6,493	41	2,315,495	– 464,640
	Midland Uruguay ...	319	Aug., 1948	22,288	+ 5,183	8	45,295	+ 11,146
	Nitrate	382	15.10.48	13,671	+ 7,583	41	245,594	+ 66,952
	N.W. of Uruguay ...	113	Aug., 1948	4,784	+ 800	8	10,013	+ 2,566
	Paraguay Cent. ...	274	15.10.48	G95,357	+ G17,881	14	G1,535,724	+ G657,497
	Peru Corp. ...	1,059	Sept., 1948	196,290	+ 10,710	13	547,471	+ 29,708
	Salvador	100	July, 1948	c85,000	+ c10,000	4	c85,000	+ c10,000
	San Paulo	153¼	—	—	—	—	—	—
	Taltal	156	Sept., 1948	8,255	+ 2,845	13	23,760	+ 7,345
	United of Havana ...	1,301	16.10.48	36,223	– 28,808	15	664,518	– 280,408
	Uruguay Northern	73	Aug., 1948	935	– 105	8	2,105	– 72
Canada	Canadian National...	23,473	Aug., 1948	10,110,000	+ 855,250	35	77,676,250	+ 5,854,000
	Canadian Pacific ...	17,037	Aug., 1948	7,735,500	+ 1,083,250	35	55,397,000	+ 4,108,000
Various	Barsi Light† ...	202	Sept., 1948	18,600	– 315	26	155,092	– 4,470
	Beira	204	July, 1948	122,639	+ 24,114	43	1,171,283	+ 243,861
	Egyptian Delta ...	607	10.9.48	19,946	+ 1,709	23	291,055	+ 29,461
	Gold Coast ...	536	Sept., 1948	165,446	+ 21,792	26	1,185,462	+ 258,231
	Manila	—	—	—	—	—	—	—
	Mid. of W. Australia	277	Aug, 1948	28,670	+ 6,667	8	52,657	+ 9,172
	Nigeria	1,900	Aug., 1948	403,545	+ 97,720	21	2,205,705	+ 483,370
	Rhodesia	2,445	Sept., 1947	643,980	+ 102,833	52	6,787,603	+ 612,938
	South Africa ...	13,347	25.9.48	1,325,832	+ 96,109	25	33,716,803	+ 1,928,160
	Victoria	4,774	June, 1948	1,358,791	+ 248,144	52	—	—

† Receipts are calculated @ 1s. 6d. to the rupee